

(Lot 62)

Site Name: H+A Kaufman Realty Company EPA ID: RID987479078

Also Site Names: _____

City: Lincoln County or Parish: — State: RI

Refer to Report Dated: PA: _____ St: 7/20/94 Other (report type & date): _____

Report developed by: TRC

DECISION:

1. Further Action under Superfund (CERCLA) is not appropriate or required because:

1a. Site Evaluation Accomplished (SEA).

1b. Action Deferred to:

1	1	RCRA
2	2	NRC

☒ 2. Further Investigation Needed Under Superfund: 2a. Priority: | | Higher ☒ Lower

26. Activity Type:

PA
SI

☒ ESI
☐ evaluate HRS score

Other:

DISCUSSION/RATIONALE:

Further study is necessary to document attribution of contamination to both ground water and surface water targets. Additional documentation of the removal of residual sludge from floor drain is necessary.

Report Reviewed
and Approved by: Sharon Hayes Signature: Sharon Hayes Date: 7/25/94

Site Decision
Made by: Sharon Hayes Signature: Sharon Hayes Date: 7/25/94



ARCS

**Remedial Planning Activities
at Selected Uncontrolled
Hazardous Substance Disposal
Sites in Region I**



**Environmental Protection Agency
Region I**

ARCS Work Assignment No. 08-1JZZ

H & A Kaufman Realty Co. (Lot 62)
Lincoln, RI
RID987479078
TDD# 9209-19-ATS

Site Inspection
Final Report

July 1994

**TRC
Companies, Inc.**

**TAMS Consultants, Inc.
PEI Associates, Inc.
Jordan Communications, Inc.**

SITE INSPECTION
H & A KAUFMAN REALTY CO. (LOT 62)
LINCOLN, RHODE ISLAND

RID987479078

FINAL REPORT

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Region I
90 Canal Street
Boston, MA 02203-2211

Work Assignment No.:	08-1JZZ
EPA Region:	I
Contract No.:	68-W9-0033 (ARCS)
TRCC Document No.:	L94-449
TRCC Project No.:	1-636-009-0-1J93
TDD No.:	9209-19-ATS
TRCC Work Assignment Manager:	Diane Stallings
TRCC Task Manager:	Tracy Jones
Telephone No.:	(508) 970-5600
EPA Work Assignment Manager:	Sharon Hayes
Telephone No.:	(617) 573-5709
Date Prepared:	July 20, 1994
Revision:	1

TRC COMPANIES, INC.
Boott Mills South
Foot of John Street
Lowell, Massachusetts 01852
(508) 970-5600

DISCLAIMER

This report is intended for use solely by the U.S. Environmental Protection Agency for the specific purposes described in the contractual documents between TRC Environmental Corporation and the U.S. Environmental Protection Agency. All professional services performed and reports generated by TRC have been prepared for the U.S. Environmental Protection Agency purposes as described in the contract. The information, statements and conclusions contained in the report have been prepared in accordance with the work statement and contract terms and conditions. The report may be subject to differing interpretations and/or may be misinterpreted by third persons or entities who were not involved in the investigative or consultation process. TRC Environmental Corporation therefore, expressly disclaims any liability to persons other than the U.S. Environmental Protection Agency who may use or rely upon this report in any way or for any purpose.

TABLE OF CONTENTS

Section	Page
1.0 INTRODUCTION	1
2.0 SITE DESCRIPTION	2
3.0 OPERATIONAL AND REGULATORY HISTORY AND WASTE CHARACTERISTICS	8
4.0 WASTE/SOURCE SAMPLING	13
5.0 GROUND WATER PATHWAY	21
6.0 SURFACE WATER PATHWAY	30
7.0 SOIL EXPOSURE PATHWAY	40
8.0 AIR PATHWAY	40
9.0 SUMMARY	41
10.0 REFERENCES	47

Appendices	Page
A Ground Water and Surface Water Analytical Results - Pare Engineering Corporation - December 1989	A-1
B Floor Drain Sample Analytical Results - Georges E. Bockstael - October 8, 1992	B-1
C Tank Tightness Test Results - Whitco Testing, Inc. - November 9, 1992	C-1
D Surface Water and Soil Sample Analytical Results - Georges E. Bockstael - November 23, 1992	D-1
E TRCC Analytical Results - May 24, 1993	E-1

TABLES

Number	Page
1 North Central Industrial Park Directory	5
2 Source Evaluation for the H & A Kaufman Realty Co. (Lot 62) Property	10
3 Sample Summary: H & A Kaufman Realty Co. (Lot 62) Property - Waste/Source Samples Collected By TRCC on May 24, 1993	16
4 Summary of Analytical Results: Waste/Source Sample Analysis for H & A Kaufman Realty Co. (Lot 62) Property	17

TABLE OF CONTENTS (CONTINUED)

Number		Page
5	Public Ground Water Supply Sources Within Four Miles of the H & A Kaufman Realty Co. (Lot 62) Property	25
6	Estimated Drinking Water Populations Served by Ground Water Sources Within Four Miles of the H & A Kaufman Realty Co. (Lot 62) Property	25
7	Summary of Analytical Results: Ground Water Samples Collected by Pare Engineering in December 1989	26
8	Sample Summary: H & A Kaufman Realty Co. (Lot 62) Property Ground Water Samples Collected by TRCC on May 24, 1993	28
9	Summary of Analytical Results: Ground Water Sample Analysis for H & A Kaufman Realty Co. (Lot 62) Property	29
10	Water Bodies Within the Surface Water Segment of the H & A Kaufman Realty Co. (Lot 62) Property	33
11	Analytical Results: Surface Water Samples Collected by Pare Engineering Corp. in December 1989	33
12	Sample Summary: H & A Kaufman Realty Co. (Lot 62) Sediment and Soil Samples Collected by TRCC on May 24, 1993	36
13	Summary of Analytical Results: Sediment and Soil Sample Analysis for H & A Kaufman Realty Co. (Lot 62) Property	37
14	Estimated Population Within Four Miles of the H & A Kaufman Realty Co. (Lot 62) Property	41

FIGURES

Number		Page
1	Location Map	3
2	Site Location Within the North Central Industrial Park	4
3	Site Sketch	6
4	Waste/Source Samples in the North Central Industrial Park	15
5	Ground Water Pathway Samples in the North Central Industrial Park	23
6	Surface Water Pathway Samples in the North Central Industrial Park	35

1.0 INTRODUCTION

TRC Companies, Inc. (TRCC) was requested by the Region I U.S. Environmental Protection Agency (EPA) Waste Management Division to perform a Site Inspection of the H & A Kaufman Realty Co. (Lot 62) property located in Lincoln, Providence County, Rhode Island. Tasks were conducted in accordance with the TDD No. 9209-19-ATS, the Site Inspection scope of work, and technical specifications provided by the EPA under Work Assignment No. 08-1JZZ. On August 10, 1992, TRCC completed a Preliminary Assessment (PA) of the H & A Kaufman Realty Co. (Lot 62) property after ground water and surface water contamination were detected on the property (Ref. 1). On the basis of the information provided in the PA report, the H & A Kaufman Realty Co. (Lot 62) Site Inspection was initiated.

Background information used in the generation of this report was obtained through file searches conducted at the Rhode Island Department of Environmental Management (RIDEM), telephone interviews with town officials, conversations with persons knowledgeable of the H & A Kaufman Realty Co. (Lot 62) property, and conversations with other federal, state, and local agencies. Additional information was collected during TRCC's onsite reconnaissance on April 5, 1993 and environmental sampling on May 24, 1993 (Ref. 2).

TRCC simultaneously completed the H & A Kaufman Realty Co. (Lot 62) Site Inspection and five other Site Inspections at properties within the North Central Industrial Park in Lincoln and Smithfield, Rhode Island. Additional field work was completed by TRCC to generate a ground water contour map of the North Central Industrial Park. From May 24 through May 27, 1993, TRCC collected environmental samples from all properties under investigation and from four private properties located south-southeast of the North Central Industrial Park.

This package follows the guidelines developed under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, commonly referred to as Superfund. However, these documents do not necessarily fulfill the requirements of other EPA regulations such as those under the Resource Conservation and

Recovery Act (RCRA) or other federal, state, or local regulations. Site Inspections are intended to provide a preliminary screening of sites to facilitate EPA's assignment of site priorities. They are limited efforts and are not intended to supersede more detailed investigations.

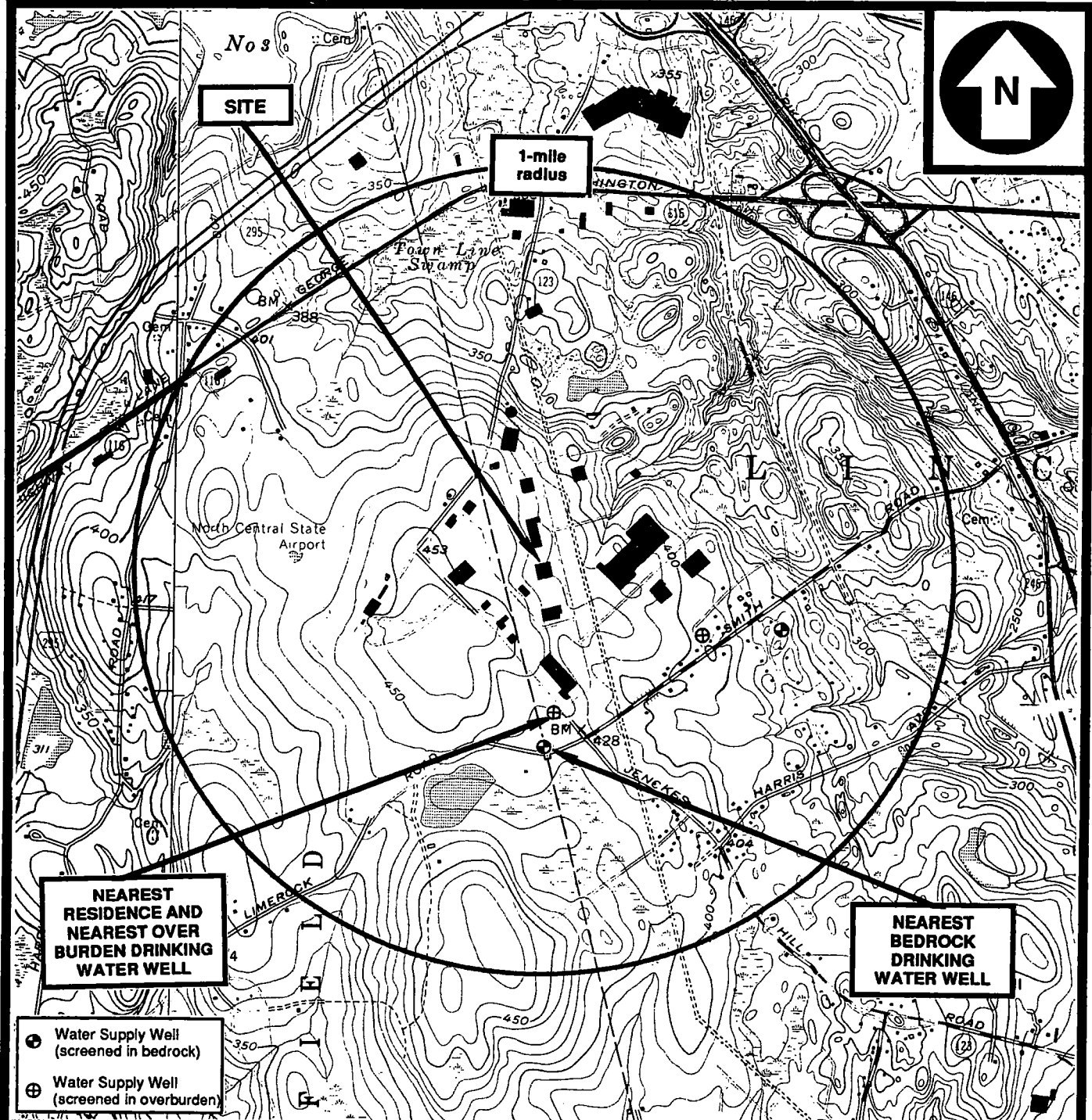
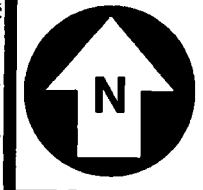
2.0 SITE DESCRIPTION

The H & A Kaufman Realty Co. (Lot 62) property is located on Powder Hill Road in the North Central Industrial Park, Lincoln, Providence County, Rhode Island (Figure 1).

Geographic coordinates are 41° 55' 16.5" north latitude and 71° 28' 53.9" west longitude (Ref. 1). The property is 5.0 acres in size and is designated as Lot 62 on Plat 28 in the Lincoln Tax Assessor's Office (Figure 2 and Table 1) (Ref. 1). From 1968 to 1990, Globe Distributing, Inc. leased the property from the H & A Kaufman Realty Co. to operate a temporary storage and distribution facility for assorted pre-packaged items such as automotive and hardware parts and lawn and garden supplies (Ref. 1). Prior to 1968, the property was undeveloped woodland (Ref. 1). The property is currently inactive (Ref. 2).

One single-story building, approximately 120,000 square feet in size, is located on the property (Figure 3) (Ref. 1,2). The building consists of approximately 100,000 square feet of warehouse space and approximately 20,000 square feet of office space (Ref. 1). According to Georges Bockstael, environmental consultant to the H & A Kaufman Realty Co., the warehouse section of the building is divided into two loading dock/garage areas and a former flammable storage area (Ref. 1,2). The loading dock/garage areas are located in the northeastern and southeastern corners of the building (Ref. 2). The former flammable storage area is located in the northwestern corner of the building (Ref. 2).

During the reconnaissance, TRCC observed two floor drains (Nos. 1 and 2) in the loading dock/garage areas of the building (Ref. 2). No elevated organic vapor readings were registered on the Organic Vapor Analyzer (OVA) in the floor drains located in the loading dock/garage areas of the building (Ref. 2). Three additional floor drains (Nos. 3, 4, and 5) and a curtain drain (No. 6) were noted by TRCC in the former flammable storage area of the



BASE MAP IS A PORTION OF THE FOLLOWING USGS 7.5' SERIES QUADRANGLES:
PAWTUCKET, RI-MA, 1949, PHOTOREVISED 1970;
GEORGIAVILLE, RI, 1954, PHOTOREVISED 1970 AND 1975



SCALE = feet



QUADRANGLE LOCATION

LOCATION MAP

H & A KAUFMAN REALTY CO. (LOT 62)
LINCOLN, RHODE ISLAND

TRC Companies, Inc.

Figure 1.



143 Lot Number from Lincoln Assessor's Map
* Lot Number not available
95¹ Lot Number from Smithfield Assessor's Map

Adapted From:
Smithfield Town Map; Plat 45
Lincoln Town Map; Plat 28

SITE LOCATION WITHIN THE NORTH CENTRAL INDUSTRIAL PARK

**H & A KAUFMAN REALTY CO. (LOT 62)
LINCOLN, RHODE ISLAND**



Figure 2.

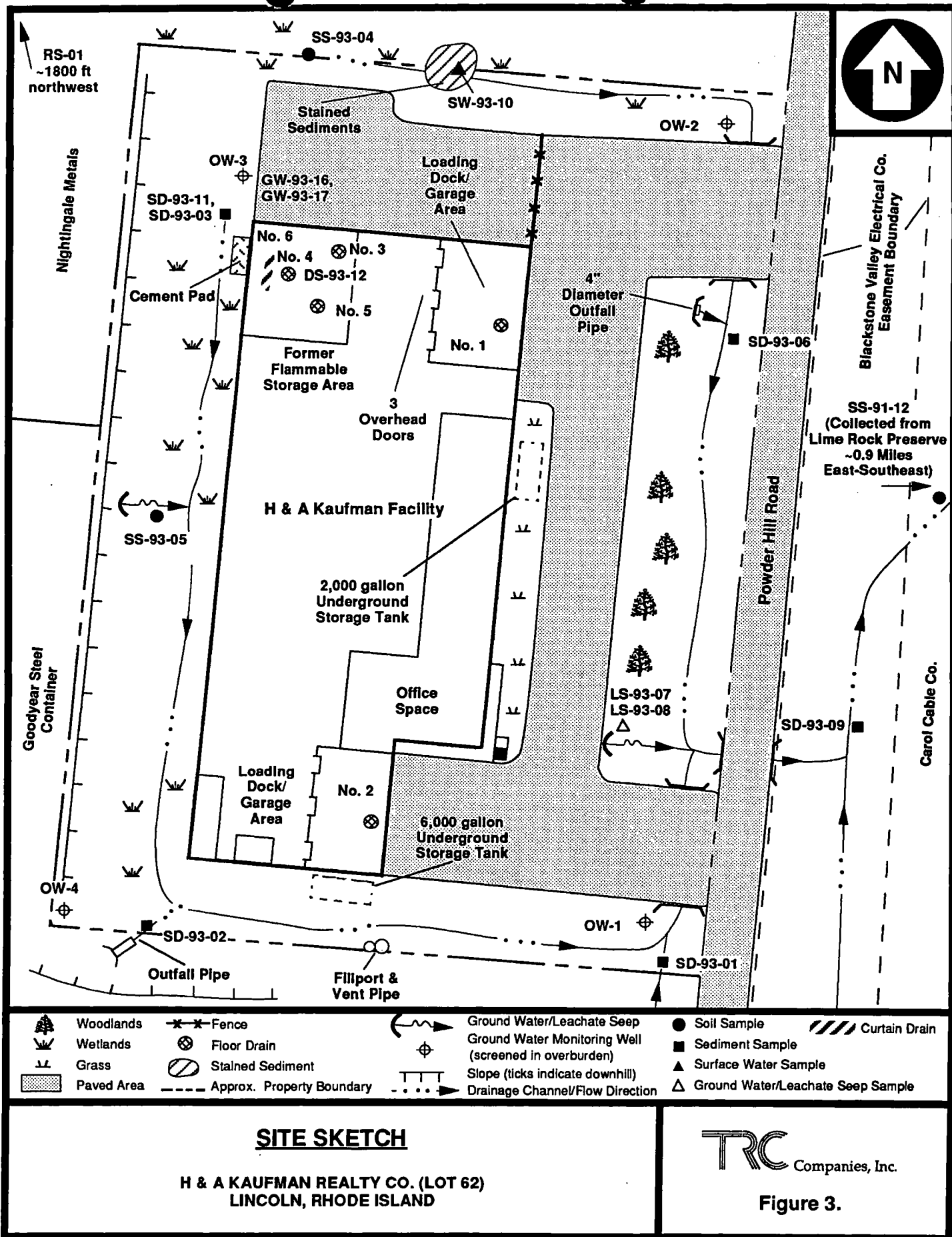
TABLE 1. NORTH CENTRAL INDUSTRIAL PARK DIRECTORY

Lot No.	Occupant/Operator
2, 137	Olin Hunt Specialty Products
47A ¹	RI National Guard
*	U.S. Army Reserve Maintenance Facility
50, 95 ¹ , 96 ¹	Speidel Company/Gorham Company
54, 47C	Avnet Diecasting (formerly Lincoln Dimensional Tube)
58	Stackbin Corp.
59	Red Hed Manufacturing Co./Lawton Manufacturing Co.
60	Dot Packaging Group-TCS, Inc.
61	Second Chase Venture (formerly Globe Distributing)
62	H & A Kaufman Realty Co.
63	Paramount Press, Inc.
64, 86 ¹	National Glass Co.
65, 85 ¹	Everett Products, Inc.
66, 84 ¹	Coating Systems, Inc.
67	Crownmark Corporation
68, 87 ¹	Crossley Machine & Tool Co./Jaco Devices
83 ¹	Sandvik Co./Madison Industries
85	Blackstone Valley Electrical Company
86, 107	Premier Thread Company
87	Goodyear Steel Container (formerly Gersham Fabricating Co.)
103, 118	Moeller Manufacturing
104, 135	International Data Sciences, Inc.
105	Carol Cable Co.
109, 136	Technical Materials
117	Vennerbeck Stern-Leach
119	Vistawall Architectural Products (formerly Hedison Manufacturing)
143	Tru-Kay Manufacturing
145	Engineered Wall Systems
146	Flint Ink Corporation
158	Lot 158/Town of Lincoln

*Lot Number was not available for this property.

¹Lot Number from the Smithfield Assessor's Map. All remaining lot numbers are from the Lincoln Assessor's Map.

(Ref. 6, 46)



building (Ref. 2). During TRCC's sampling activities at the H & A Kaufman property, organic vapors were only detected in drain No. 4 at a concentration of 7 parts per million (ppm) (Ref. 2). No stains were noted on the concrete floor in the H & A Kaufman building (Ref. 2). The terminus of the building's drains is not known (Ref. 2). According to Georges Bockstael, the drains may possibly discharge to a dry well located west of the onsite building beneath a concrete pad (Ref. 2). TRCC was unable to confirm the presence of a dry well on the H & A Kaufman property.

Two underground storage tanks (USTs) containing No. 2 fuel oil are located on the H & A Kaufman property (Ref. 2). Tank No. 1 is located on the southern side of the building. It is approximately 12 years old and has a capacity of 6,000 gallons (Ref. 2). Tank No. 2 is located on the eastern side of the building. It is approximately 20 years old and has a capacity of 2,000 gallons (Ref. 2). The USTs are currently used to heat the facility (Ref. 2). In November 1992, Whitco Testing Inc. was employed to test the structural integrity of the USTs. Both USTs were found to be in compliance with state regulations (Ref. 3).

The H & A Kaufman property is relatively flat, gently sloping to the east toward Powder Hill Road (Ref. 2). Based on the U.S. Geological Survey topographic map for the area, most of the property appears to be between 420 and 430 feet above mean sea level (Ref. 4). Drainage channels are located parallel to the north, south, east, and west sides of the property. These drainage channels receive runoff from the rear and the sides of the building, as well as from properties located north, south, and west of the H & A Kaufman property (Ref. 2). Surface water runoff from drainage channels located on the H & A Kaufman property flows east into a drainage channel that runs parallel to Powder Hill Road (Ref. 2).

During the reconnaissance, TRCC observed two ground water/leachate seeps located on the western and eastern sides of the property (Ref. 2). In addition, TRCC personnel observed an outfall pipe discharging to the drainage channel located south of the H & A Kaufman building (Ref. 2). The outfall pipe appears to originate from one of the properties located west of the H & A Kaufman property (Ref. 2). According to past studies, water discharged from the outfall pipe is warmer than surface water in other drainage channels located on the

H & A Kaufman property (Ref. 3). A second outfall pipe was observed by TRCC in the drainage channel located east of the H & A Kaufman building (Ref. 2). The origin of the outfall pipe is not known (Ref. 2). TRCC did not observe stained soil or sediments in the vicinity of the outfall pipes (Ref. 2).

Stained soil/sediments were noted by TRCC personnel in a drainage channel located north of the H & A Kaufman building (Ref. 2). Surface water in the drainage channel was bright orange in color (Ref. 2). Surface water in the drainage channel may possibly originate from Lot 61, which is located north of the H & A Kaufman property (Ref. 2). Lot 61 was formerly occupied by the following businesses: Second Chase Venture, Chase Brass and Copper Co., and Globe Distributing, Inc. (Ref. 1). Records indicate that each of these three occupants utilized the property for a warehouse and/or distribution center (Ref. 5). Lot 61 has been inactive since May 1990 (Ref. 5).

A paved parking area is located on the eastern side of the H & A Kaufman property; the remainder of the property is unpaved and covered with brush (Ref. 2). Vehicular and pedestrian access to the property is unrestricted (Ref. 2).

The H & A Kaufman property is bordered to the east by Powder Hill Road; to the south by Paramount Press, Inc. (Lot 63), a commercial printing facility; to the north by a vacant building formerly occupied by Second Chase Venture, Chase Brass and Copper Co., and Globe Distributing, Inc. (Lot 61); and to the west by Engineered Wall Systems (Lot 145) and Goodyear Steel Container (Lot 87), a prefabricator of exterior wall panels and a metals fabricator, respectively (Ref. 2).

3.0 OPERATIONAL AND REGULATORY HISTORY AND WASTE CHARACTERISTICS

The H & A Kaufman property is one of 29 parcels located within the North Central Industrial Park in Lincoln and Smithfield, Rhode Island (Ref. 6). The North Central Industrial Park was developed in 1962 by the Second Pawtucket Area Industrial Foundation (SPAIF) and consists

of approximately 248 acres (Ref. 6). Prior to 1962, the land was owned by the state of Rhode Island and was undeveloped (Ref. 6). In 1968, SPAIF constructed the onsite building and sold the property to Arnold N. Kaufman and Howard S. Kaufman, who owned the property until 1976 (Ref. 6). In 1976, the property was purchased by the Rachel Realty Co. (Ref. 6). The Rachel Realty Co. sold the property in 1986 to the H & A Kaufman Realty Co., which is owned by Arnold N. Kaufman and Howard S. Kaufman (Ref. 6). Since 1986, the H & A Kaufman Realty Co. has remained the property owner (Ref. 6).

Between 1968 and September 1990, Globe Distributing, Inc. utilized the H & A Kaufman property as a temporary storage and distribution facility (Ref. 1,7). In September 1990, Globe Distribution, Inc. vacated the property (Ref. 1,7). Since September 1990, the property has remained unoccupied (Ref. 1,2).

Items which were stored at the facility by Globe Distributing, Inc. included automotive parts, hardware, and lawn and garden supplies (Ref. 7). Past studies indicate that all materials were fully boxed or containerized during the storage and/or distribution process (Ref. 7). A review of RIDEM and EPA files found no records documenting the disposal, use, or storage of potentially hazardous substances on the H & A Kaufman property (Ref. 1,2).

There are 27 RCRA notifiers within a one-mile radius of the H & A Kaufman property (Ref. 8,9). There are 13 CERCLIS sites within a one-mile radius of the H & A Kaufman property (Ref. 8,9).

Table 2 presents identified structures or areas on the H & A Kaufman property that are potential sources of contamination, the containment factors associated with each source, and the relative location of each source.

In March 1980, the Rhode Island Department of Health (RIDOH) in conjunction with the RIDEM was ordered by Executive Order No. 80-8 to develop an Emergency Well Testing Program to investigate potential ground water contamination in the vicinity of the North Central Industrial Park. The RIDOH and the RIDEM initiated this action based on

TABLE 2. SOURCE EVALUATION FOR THE H & A KAUFMAN REALTY CO. (LOT 62) PROPERTY		
Potential Source Area	Containment Factors	Spatial Location
Former Flammable Storage Area	Concrete floor.	Northwestern corner of the H & A Kaufman building.
Drainage Channel	None.	Located along the southern and eastern property boundary.
Contaminated Soil/Sediment	None.	Located north of H & A Kaufman building, in drainage channel.
6,000-gallon UST; contains No. 2 fuel oil.	Constructed of steel.	South of H & A Kaufman building.
2,000-gallon UST; contains No. 2 fuel oil.	Constructed of steel.	East of H & A Kaufman building.

(Ref. 1,2)

information concerning overflows of wastewater containing organic compounds from the Olin Hunt Specialty Products, Inc. property (Olin/Hunt). Three overflows have occurred at the Olin/Hunt property, two in 1978 and one in January 1981. The overflows resulted from a failure of the pump and overflow warning system and resulted in wastewater overflowing from the underground tanks. Subsequently, the containment dike surrounding the tanks failed to contain the spill and wastewater was released to the ground surface. The volume of the wastewater released is not known for the 1978 spills; however, approximately 500 to 600 gallons were released in January 1981. This was the primary event which initiated the RIDOH/RIDEM investigation of the North Central Industrial Park (Ref. 10).

In January 1981, the RIDEM issued an Order to Olin/Hunt requiring correction of the wastewater overflow problem; however, Olin/Hunt had initiated remedial action prior to the issuance of the Order. The Order required that Olin/Hunt correct its wastewater release problem, investigate and repair leaks of the wastewater treatment system, and install ground

monitoring wells. In January 1981, Olin/Hunt officials informed the RIDEM that ground water samples collected from the monitoring wells exhibited contamination beneath the Olin/Hunt plant. Olin/Hunt's environmental investigation identified several compounds that were not unique to their operations and identified the possibility of other nearby sources contributing to ground water contamination (Ref. 10).

By the end of January 1981, analytical results from the first round of private well sampling within a half-mile radius of Olin/Hunt had been completed. Organic contaminants were identified in 74 private wells within a half-mile radius of the southern boundary of the industrial park. The organic compound concentrations in the 74 private wells were described as "very low levels"; however, nine of the 74 private wells had "high" concentrations of organic compounds. TRCC was unable to determine the location of the nine "highly contaminated" private drinking water wells. The RIDOH recommended that the nine "highly contaminated" wells not be used as a potable water supply. The town of Lincoln subsequently installed public water supply lines throughout the area having contaminated private wells. TRCC was unable to obtain the completion date of this task from the Lincoln Water Department (Ref. 10).

The following is a summary of the investigative and regulatory activities which have occurred at the H & A Kaufman property since 1989.

- In 1989, the H & A Kaufman Realty Co. retained Pare Engineering Corporation of Lincoln, Rhode Island to conduct an investigation of the property (Ref. 7). As part of this investigation, four monitoring wells were installed on the property by Guild Drilling Co., Inc. of East Providence, Rhode Island (Ref. 11). In December 1989, ground water samples were collected from each of the four monitoring wells (OW-1, OW-2, OW-3, and OW-4) (Ref. 11). Two surface water samples (SW-1 and SW-2) were also collected from drainage channels located on the property (Ref. 11). The exact locations of the surface water samples collected by Pare Engineering Corporation were not included in the report. Ground water and surface water samples were analyzed by Eastern Scientific Associates of Brooklyn, Connecticut for volatile organic compounds (VOCs) and inorganics according to EPA Methods

624 and SWA-846, respectively (Ref. 11). Sample analytical results are discussed in Section 5.0 and Section 6.0 of this report. Complete analytical results and boring logs are included in Appendix A.

- On July 29, 1991, NUS Corporation completed a Site Discovery report of the North Central Industrial Park. The initial Site Discovery of the North Central Industrial Park identified 29 properties within the industrial park boundaries. The H & A Kaufman property was identified as requiring continued investigation under CERCLA (Ref. 6).
- On August 10, 1992, TRCC completed a PA of the H & A Kaufman Realty Co. (Lot 62) property after ground water and surface water contamination were detected on the property (Ref. 1). The report recommended further investigative work under CERCLA (Ref. 1).
- On October 8, 1992, H & A Kaufman Realty Co. retained Georges Bockstael to collect an aqueous sample from floor drain No. 4 in the former flammable storage area of the H & A Kaufman building (Ref. 3). The sample was analyzed by Analytical Testing Services, Inc. of Smithfield, Rhode Island for VOCs according to EPA Method 624 (Ref. 3). Sample analytical results are discussed in Section 4.0 of this report. Complete analytical results are included in Appendix B.
- On November 9, 1992, Whitco Testing Inc. of Narragansett, Rhode Island tested the integrity of the two active USTs on the H & A Kaufman property (Ref. 3). The USTs were determined to be in compliance with state regulations (Ref. 3). A copy of the testing results are presented in Appendix C.
- On November 23, 1992, Georges Bockstael collected a surface water sample and a soil sample from a drainage channel located west of the former flammable storage area (Ref. 3). The exact locations of the surface water and soil samples were not available in the file information. The samples were analyzed by R.I. Analytical Laboratories, Inc. of Warwick, Rhode Island for VOCs according to EPA Methods 601/602 and 8010/8020 (Ref. 3). Sample analytical results are discussed in Section 6.0 of this report. Complete analytical results are included in Appendix D.
- On December 23, 1992, H & A Kaufman Realty Co. retained Clean Harbors, Inc. to remove residual sludge from drains located in the former flammable storage area of the H & A Kaufman building (Ref. 3). HNu analysis of the drains after sludge removal indicated a VOC concentration of 0.4 ppm (Ref. 3). Complete analytical results of the sludge analysis by Clean Harbors, Inc. were not available.

- On April 5, 1993, TRCC personnel conducted a site reconnaissance of the H & A Kaufman property (Ref. 2).
- On April 13, 1993, TRCC measured and recorded water levels in 34 monitoring wells on selected properties within the North Central Industrial Park. The monitoring wells were then surveyed to a Rhode Island Department of Transportation benchmark by a TRCC survey team. The survey was tied into the state grid system which allowed TRCC to generate a base map of the study area. The ground water elevations, monitoring well locations, selected buildings, and streets were plotted on the computer-generated base map. TRCC constructed the water table contour map by hand, using standard three-point interpolation methods as specified in the EPA Ground Water Flow Net Flow Line Technical Resource Document (GCA-TR-85-61-G). Hand contouring allowed TRCC to combine factors such as local geology, topography and field observations in the interpretation of the ground water elevation data. Ground water elevation values and contours for the North Central Industrial Park are presented on Figure 5.
- On May 24, 1993, TRCC personnel conducted environmental sampling activities at the H & A Kaufman property (Ref. 2).

4.0 WASTE/SOURCE SAMPLING

On October 8, 1992, Georges Bockstael was retained by the H & A Kaufman Realty Co. to collect one aqueous sample from floor drain No. 4 in the former flammable storage area of the H & A Kaufman building (Ref. 3). The sample was analyzed by Analytical Testing Services, Inc. of Smithfield, Rhode Island for VOCs according to EPA Method 624 (Ref. 3). Methylene chloride and o-xylene were detected in the floor drain sample at concentrations of 44.5 micrograms per liter ($\mu\text{g/L}$) and 67.0 $\mu\text{g/L}$, respectively (Ref. 3). Complete analytical results and quantitation limits are presented in Appendix B.

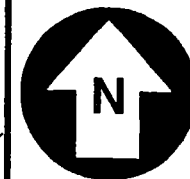
On May 24, 1993, TRCC collected eight potential source samples from the H & A Kaufman property. These samples included one floor drain sample from drain No. 4 in the former flammable storage area of the building, two samples collected from a ground water/leachate seep east of the onsite building, one soil sample collected from a dry leachate outbreak west of the onsite building, one surface water sample collected from an area of orange stained

sediment within a drainage channel north of the onsite building, one soil sample collected from the drainage channel located north of building, and one sediment sample collected from the drainage channel located in the southwestern corner of the property.

Figure 4 presents all of the TRCC waste/source sample locations within the North Central Industrial Park. The sample locations will be referenced in the text by the TRCC sample location number and the Figure 4 legend sample number. The Figure 4 legend sample number is also presented in Table 3. Table 3 presents a summary of potential source samples collected from the H & A Kaufman property by TRCC. All samples were analyzed for full Target Compound List (TCL) volatile organic compounds (VOCs); semi-volatile organic compounds (SVOCs), which include base-neutral/acid extractables (BNAs), pesticides, and polychlorinated biphenyls (PCBs); and Target Analyte List (TAL) inorganics, and cyanide through the Contract Laboratory Program (CLP) under Routine Analytical Services (RAS) Case Number 20060 (Ref. 12).

The complete analytical results of TRCC's sampling activities are presented in Appendix E. Table 4 presents the compounds and elements detected in source samples collected from the H & A Kaufman property. Inclusion of a compound or analyte in Table 4 is based upon its detection at a concentration equal to or exceeding three times the concentration of the same compound or element detected in a reference sample. If the compound or element was not detected in the reference sample, then concentrations are compared to the Contract Required Quantitation Limits (CRQLs) or Contract Required Detection Limits (CRDLs); a constituent is listed on Table 4 if it was detected at a concentration equal to or exceeding CRQLs or CRDLs. Compounds and elements listed on Table 4 are referred to in this report as exceeding reference values.

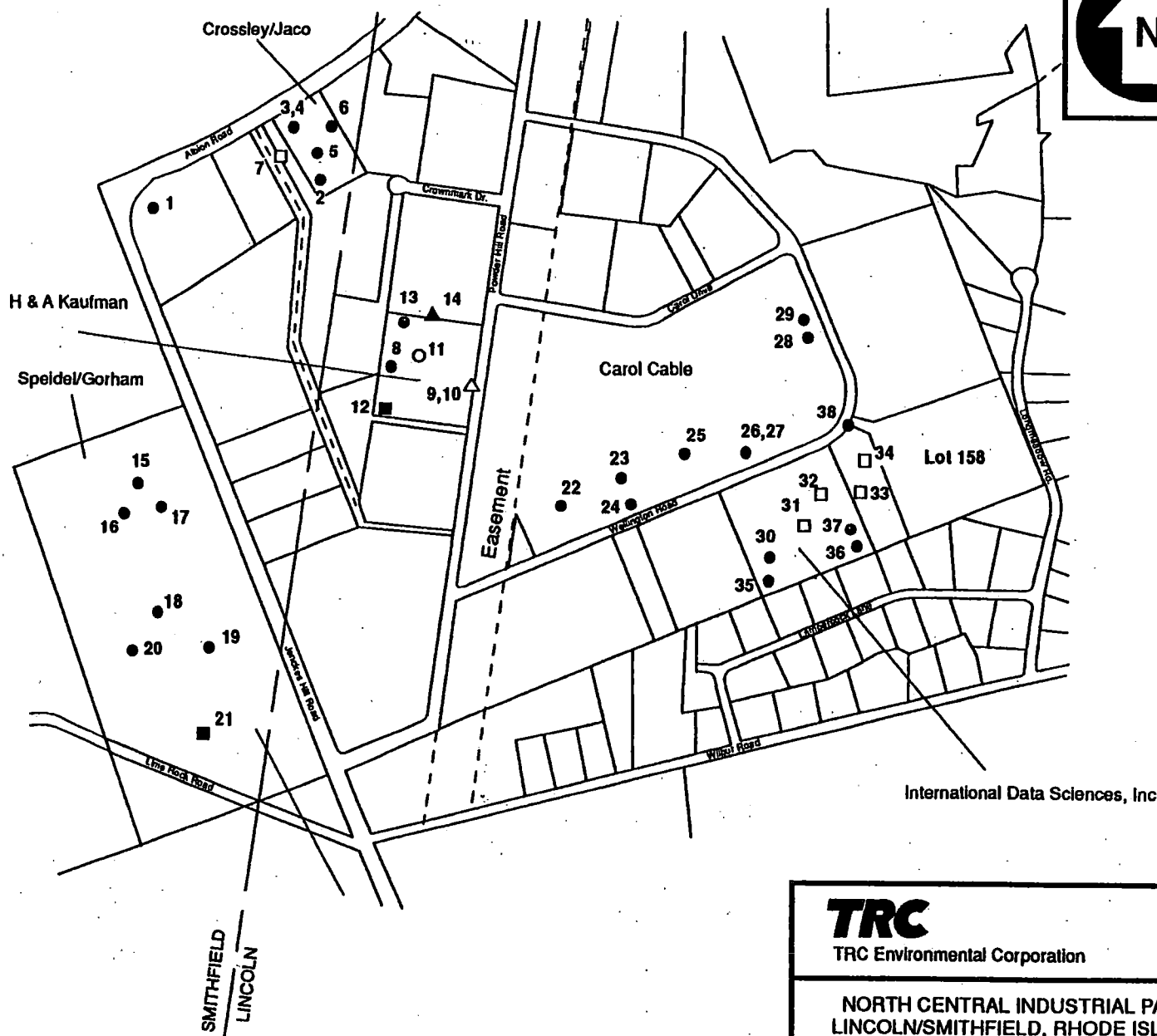
In accordance with EPA guidance, TRCC selected reference samples for each medium, and, with sediments, for each flow regime. Sample RS-01 (1) (Figure 4), collected from an apparently undisturbed area approximately 1,800 feet northwest of the H & A Kaufman property was selected as the reference sample for soil samples SS-93-04 (13) and SS-93-05



- Soil Sample
- Sediment Sample
- Floor Drain Sample
- Deep Soil Sample
- △ Ground Water/Leachate Seep Sample
- ▲ Surface Water Sample

SAMPLE LOCATIONS

- 1 RS-01
- 2 SS-92-01
- 3 SS-92-02
- 4 SS-92-03 (Dup. of SS-92-02)
- 5 SS-92-04
- 6 SS-92-06
- 7 SB-92-07
- 8 SS-93-05
- 9 LS-93-07
- 10 LS-93-08 (Dup. of LS-93-07)
- 11 DS-93-12
- 12 SD-93-02
- 13 SS-93-04
- 14 SW-93-10
- 15 SS-96-02
- 16 SS-96-01
- 17 SS-96-03
- 18 SS-96-04
- 19 SS-96-06
- 20 SS-96-05
- 21 SD-96-07
- 22 SS-91-06
- 23 SS-91-07
- 24 SS-91-08
- 25 SS-91-09
- 26 SS-91-10
- 27 SS-91-11
- 28 SS-91-13
- 29 SS-91-21
- 30 SS-94-12
- 31 SB-94-11
- 32 SB-94-10
- 33 SB-94-08
- 34 SB-94-09
- 35 SS-94-13
- 36 SS-94-14
- 37 SS-94-15
- 38 SS-95-03



TRC

TRC Environmental Corporation

NORTH CENTRAL INDUSTRIAL PARK
LINCOLN/SMITHFIELD, RHODE ISLAND
ARCS W.A. 08-1JZZ

FIGURE 4. WASTE/SOURCE SAMPLES

Adapted From: Smithfield Town Map; Plat 45 Lincoln Town Map; Plat 28

Not to Scale

TABLE 3. SAMPLE SUMMARY: H & A KAUFMAN REALTY CO. (LOT 62) PROPERTY Waste/Source Samples Collected By TRCC on May 24, 1993				
Sample Location No.	Traffic Report No.	Time/ Date	Remarks	Sample Source
Matrix: Aqueous				
DS-93-12 (11)	AFG12 MABF27	0950 5/24/93	NA	Sample collected from floor drain No. 4 located in former flammable storage area inside H & A Kaufman building.
LS-93-07 (9)	AFG11 MABF22	1940 5/24/93	NA	Sample collected from ground water/leachate seep east of onsite building.
LS-93-08 (10)	AFG12 MABF23	1945 5/24/93	NA	Duplicate of LS-93-07 collected for quality control.
SW-93-10 (14)	AFG14 MABF25	2000 5/24/93	NA	Surface water sample collected from drainage channel with staining on northern side of property.
Matrix: Sediment				
SD-93-02 (12)	ADC41 MABF01	1930 5/24/93	0-6" Grab	Collected in drainage channel on south side of property; downgradient of outfall pipe.
SD-93-03 (59)	ADC42 MABF02	2015 5/24/93	0-6" Grab	Reference sediment sample collected upgradient of outfall pipe in drainage channel on western side of property. Depicted on Figure 6.
Matrix: Soil				
RS-01 (1)	AEH41 MACD48	0950 5/27/93	0-6" Grab	Reference soil sample collected approximately 1,800 feet northwest of H & A Kaufman property.
SS-93-04 (13)	AFG08 MABF03	2025 5/24/93	0-6" Grab	Soil sample collected from drainage channel with staining on northern side of property.
SS-93-05 (8)	AFG09 MABF20	2021 5/24/93	0-6" Grab	Collected from dry leachate seep west of onsite building.

NA - Not Applicable

(#) - Figure 4 Legend Number

(Ref. 2)

**TABLE 4. SUMMARY OF ANALYTICAL RESULTS: WASTE/SOURCE SAMPLE
ANALYSIS FOR H & A KAUFMAN REALTY CO. (LOT 62) PROPERTY**

Sample Location No.	Compound/Element	Concentration		Reference Concentration		Comments
DS-93-12 (11)	acetone	97	µg/L	10	µg/L	9.7 × CRQL
	toluene	310	µg/L	10	µg/L	31 × CRQL
	xylenes (total)	37 J	µg/L	10	µg/L	3.7 × CRQL
	aluminum	1,440 J	µg/L	200	µg/L	7.2 × CRDL
	calcium	15,500	µg/L	5,000	µg/L	3.1 × CRDL
	copper	99.6	µg/L	25	µg/L	3.9 × CRDL
	iron	43,600 J	µg/L	100	µg/L	440 × CRDL
	lead	111 J	µg/L	3	µg/L	37 × CRDL
	manganese	439 J	µg/L	15	µg/L	29 × CRDL
	potassium	16,500	µg/L	5,000	µg/L	3.3 × CRDL
	sodium	20,100 J	µg/L	5,000	µg/L	4.0 × CRDL
	zinc	321	µg/L	20	µg/L	16 × CRDL
LS-93-07 (9)	calcium	10,300	µg/L	5,000	µg/L	2.0 × CRDL
	iron	579 J	µg/L	100	µg/L	5.7 × CRDL
	manganese	475 J	µg/L	15	µg/L	32 × CRDL
	sodium	40,600 J	µg/L	5,000	µg/L	8.1 × CRDL
LS-93-08 (10) (dup. of LS-93-07)	calcium	10,200	µg/L	5,000	µg/L	2.0 × CRDL
	manganese	350 J	µg/L	15	µg/L	22 × CRDL
	sodium	40,600	µg/L	5,000	µg/L	8.1 × CRDL
SW-93-10 (14)	aluminum	1,240 J	µg/L	200	µg/L	6.2 × CRDL
	calcium	11,900	µg/L	5,000	µg/L	2.3 × CRDL
	manganese	1,580 J	µg/L	15	µg/L	100 × CRDL
	sodium	12,100 J	µg/L	5,000	µg/L	2.4 × CRDL
	zinc	50.1	µg/L	20	µg/L	2.5 × CRDL
SD-93-02 (12)	phenanthrene	3,400	µg/kg	330	µg/kg	10 × CRDL
	anthracene	420 J	µg/kg	330	µg/kg	1.3 × CRDL
	carbazole	720 J	µg/kg	330	µg/kg	2.2 × CRDL
	fluoranthene	5,600	µg/kg	330	µg/kg	17 × CRDL
	pyrene	4,300	µg/kg	330	µg/kg	13 × CRDL
	benzo(a)anthracene	2,200	µg/kg	330	µg/kg	6.6 × CRDL
	chrysene	2,400	µg/kg	330	µg/kg	7.3 × CRDL
	benzo(b)fluoranthene	4,500	µg/kg	330	µg/kg	14 × CRDL
	benzo(k)fluoranthene	4,500	µg/kg	330	µg/kg	14 × CRDL
	benzo(a)pyrene	2,100	µg/kg	330	µg/kg	6.4 × CRDL
	indeno(1,2,3-cd)pyrene	1,800	µg/kg	330	µg/kg	5.4 × CRDL
	dibenz(a,h)anthracene	420 J	µg/kg	330	µg/kg	1.3 × CRDL
	benzo(g,h,i)perylene	2,000	µg/kg	330	µg/kg	6.1 × CRDL
	lead	22.3 J	mg/kg	5.8	mg/kg	3.8 × Ref.
	selenium	1.1	mg/kg	1	mg/kg	1.1 × CRDL

TABLE 4. (CONTINUED)

Sample Location No.	Compound/ Element	Concentration			Reference Concentration			Comments
SS-93-04 (13)	phenanthrene	930	J	µg/kg	110	J	µg/kg	8.4 × Ref.
	pyrene	980	J	µg/kg	130	J	µg/kg	7.5 × Ref.
	benzo(a)anthracene	620	J	µg/kg	67	J	µg/kg	9.2 × Ref.
	chrysene	780	J	µg/kg	69	J	µg/kg	11 × Ref.
	benzo(b)fluoranthene	1,300	J	µg/kg	130	J	µg/kg	10 × Ref.
	benzo(k)fluoranthene	1,300	J	µg/kg	130	J	µg/kg	10 × Ref.
	benzo(a)pyrene	540	J	µg/kg	56	J	µg/kg	9.6 × Ref.
	endosulfan sulfate	6.6	J	µg/kg	1.1	J	µg/kg	6 × Ref.
	barium	51.9		mg/kg	11.6		mg/kg	4.4 × Ref.
	calcium	3,420		mg/kg	230		mg/kg	15 × Ref.
	magnesium	1,670		mg/kg	243		mg/kg	6.8 × Ref.
	manganese	242		mg/kg	17.3		mg/kg	14 × Ref.
	potassium	1,040		mg/kg	1,000		mg/kg	1.0 × CRDL
	vanadium	13.9		mg/kg	10		mg/kg	1.3 × CRDL
SS-93-05 (8)	manganese	73.3		mg/kg	17.3		mg/kg	4.2 × Ref.
	magnesium	805		mg/kg	243		mg/kg	3.3 × Ref.
	calcium	998		mg/kg	230		mg/kg	4.3 × Ref.

µg/L - micrograms per liter

mg/kg - milligrams per kilogram

CRQL - Contract Required Quantitation Limit

CRDL - Contract Required Detection Limit

J - Value is an estimated quantity

- Figure 4 Legend Number

Ref. - Reference Sample

µg/kg - micrograms per kilogram

(8). Sample SD-93-03 (59) (Figure 6) collected from a drainage channel west of the onsite building and upstream of the outfall pipe, was selected as the reference sample for sediment sample SD-93-02 (12). A surface water reference sample was not collected for sample SW-93-10 (14) because SW-93-10 (14) was collected at the furthest upstream location in the drainage channel. Compounds or analytes detected in surface water sample SW-93-10 (14) are compared to CRQLs or CRDLs. TRCC was unable to collect a sediment sample in the vicinity of surface water sample SW-93-10 (14) due to the large amount of organic matter in the sediments. In addition, reference samples were not designated for drain sample

DS-93-12 (11) or leachate samples LS-93-07 (9) and LS-93-08 (10); therefore compounds or analytes are compared to CRQLs or CRDLs.

The floor drain sample and leachate samples collected from the H & A Kaufman property are described as clear (Ref. 2). Sediment samples SD-93-03 (59) and SD-93-02 (12) and soil samples SS-93-04 (13) and SS-93-05 (8) are described as brown sand and silt with some organics (Ref. 2). Soil sample RS-01 (1) is described as gray to brown fine sand and silt (Ref. 2). Surface water sample SW-93-10 (14) is described as clear, brown/orange in color, with some silt (Ref. 2).

Three VOCs, acetone, toluene, and total xylenes, were detected above reference criteria in floor drain sample DS-93-12 (11). VOC concentrations in sample DS-93-12 (11) ranged from 37 µg/L (total xylenes) to 310 µg/L (toluene). Acetone use and storage in USTs has been documented at locations hydraulically upgradient of the H & A Kaufman property (Ref. 12).

No SVOCs were detected at concentrations exceeding reference values in sample DS-93-12 (11). Four pesticides were present in sample DS-93-12 (11); however, none of the pesticides were detected at concentrations exceeding CRQLs. In addition, three BNAs were present in sample DS-93-12 (11); however, none of the BNAs were detected at concentrations exceeding CRQLs. Nine inorganic elements were detected above reference criteria in sample DS-93-12 (11). Inorganic concentrations in sample DS-93-12 (11) ranged from 99.6 µg/L (copper) to 43,600 µg/L (iron).

No VOCs or SVOCs were present above reference criteria in ground water/leachate seep samples LS-93-07 (9) and its duplicate LS-93-08 (10) collected from the H & A Kaufman property. However, 1,1-dichloroethane and 1,1,1-trichloroethane were present in both samples at concentrations below the CRQL of 10 µg/L. Four inorganic elements were present above reference criteria in samples LS-93-07 (9) and LS-93-08 (10). Inorganic concentrations in samples LS-93-07 (9) and LS-93-08 (10) ranged from 350 µg/L (manganese in LS-93-08) to 40,600 µg/L (sodium in LS-93-07 and LS-93-08). No pesticides/PCBs were detected in sample LS-93-07 (9) or LS-93-08 (10).

No VOCs or SVOCs were detected exceeding reference values in surface water sample SW-93-10 (14). Sample SW-93-10 (14) was collected from an area of stained sediments and discolored surface water in the drainage channel located north of the H & A Kaufman building. Sample SW-93-10 (14) contained 1,1-dichloroethane at a concentration of 2 µg/L, which is below the CRQL value of 10 µg/L. Five inorganic elements were detected exceeding CRDLs in sample SW-93-10 (14). Inorganic elements were present at concentrations ranging from 50.1 µg/L (zinc) to 12,100 µg/L (sodium).

No VOCs were detected in sediment sample SD-93-02 (12) collected downstream of the outfall pipe located on the southwestern corner of the property. Twelve polycyclic aromatic hydrocarbons (PAHs) were detected at concentrations exceeding reference values in sample SD-93-02 (12); the most abundant PAHs detected were fluoranthene, pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene, which were detected at concentrations ranging from 4,300 micrograms per kilogram (µg/kg) to 5,600 µg/kg. The high concentrations of PAHs detected in sediment sample SD-93-02 (12) may possibly be related to road runoff from the paved access road leading to Goodyear Steel Container (Lot 87). PAHs can be generated by the combustion of petroleum products (Ref. 13).

Two inorganic elements, lead and selenium, were detected in sediment sample SD-93-02 (12) at concentrations exceeding reference values. In addition, three pesticides, dieldrin, 4,4'-DDT, and endrin ketone, were detected at concentrations below reference values in sample SD-93-02 (12). Pesticide concentrations ranged from 0.4 µg/kg (dieldrin) to 2 µg/kg (endrin ketone).

No VOCs were detected in soil sample SS-93-04 (13) collected in the vicinity of stained sediments in the drainage channel located north of the H & A Kaufman property. Seven PAHs were present above CRQLs in soil sample SS-93-04 (13) at concentrations ranging from 540 µg/kg (benzo[a]pyrene) to 1,300 µg/kg (benzo[b]fluoranthene and benzo[k]fluoranthene). In addition, analysis of soil sample SS-93-04 (13) indicated the presence of endosulfan sulfate at 6.6 µg/kg. Three other pesticides, 4,4'-DDE, endrin, and 4,4'-DDT, were detected at concentrations below reference values. The presence of pesticides

in sample SS-93-04 (13) is most likely a result of routine pesticide application in the industrial park. Six inorganic elements were detected in soil sample SS-93-04 (13) above CRDLs.

No VOCs or SVOCs were detected in soil sample SS-93-05 (8) collected from a dry ground water/leachate seep located west of the H & A Kaufman building. Three inorganic elements were present above reference criteria in sample SS-93-05 (8). Inorganic concentrations ranged from 73.3 milligrams per kilogram (mg/kg) (manganese) to 998 mg/kg (calcium).

5.0 GROUND WATER PATHWAY

Soils on the H & A Kaufman property are classified as Udorthents - Urban Land Complex (UD) (Ref. 12). The UD unit is characterized as soils that have been cut and/or filled, or areas that are covered with buildings and pavement (Ref. 14).

A review of environmental reports, aerial photographs, early topographic maps, and TRCC field observations in the North Central Industrial Park suggests that fill materials have been deposited in this area to level the original slope of the surrounding area, which sloped gently to the east-southeast. Composition of the fill material has been described as fine to medium sand, with gravel, cobbles and silt (Ref. 1,2,15).

The surficial geology of the H & A Kaufman property and the area surrounding the North Central Industrial Park is mapped as glacial ground moraine, consisting of two different till types (Ref. 1,15). One is described as a light gray, loose, sandy unit with a thin oxidation zone (Ref. 1,15). The second till type is brownish, more compact, and indurated (Ref. 1,15). The depth of the till unit is approximately 5 to 25 feet below ground surface (Ref. 1,15).

Bedrock underlying the property is mapped as Esmond Granite (Ref. 16). It is a light gray, pink, and flesh-colored, medium to coarse-grained gneissic granite which contains microperthite, albite, quartz, and biotite. Published literature indicates the depth to bedrock

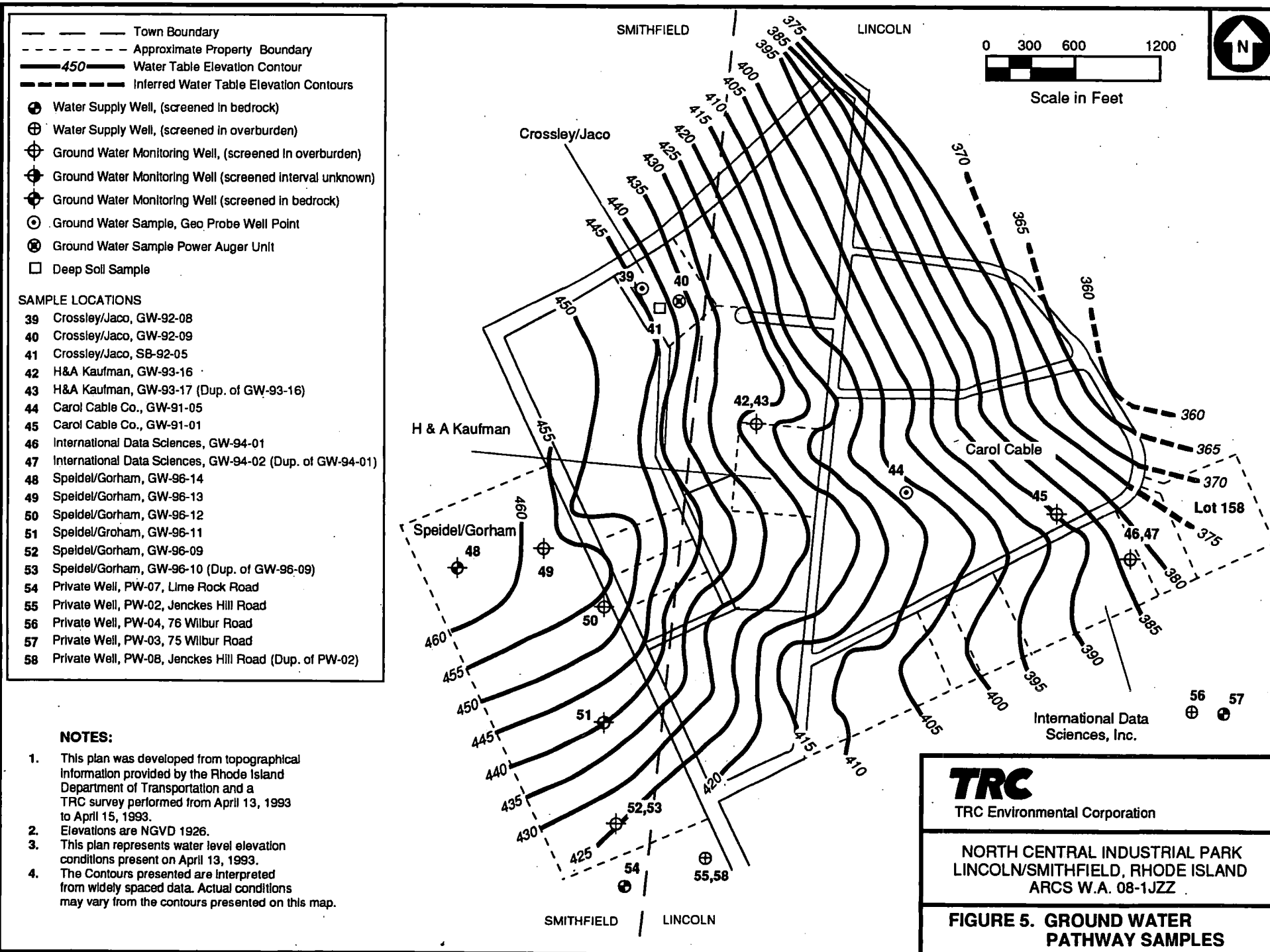
ranges from 5 to 25 feet below ground surface. Lineation is very distinct in the Esmond Granite (Ref. 16).

The ground water in the area of the H & A Kaufman property is classified by the state of Rhode Island as "GB " (Ref. 17). This designation refers to ground water located within a highly urbanized area of industrial activity where public water supply is available. GB areas of ground water denote ground water which may not be suitable for human consumption due to releases of wastes which have impacted the area.

In 1990, the RIDEM's Wellhead Protection Program was approved by the U.S. EPA. Wellhead Protection Areas (WHPAs) are established to protect recharge areas of public drinking water supply systems. There are WHPAs within the towns of Lincoln, Smithfield, and Cumberland, Rhode Island. The closest WHPA to the H & A Kaufman property is 1.7 miles to the northeast in the town of Lincoln at Autocrat, Inc. (Ref. 18).

According to ground water elevation data collected by TRCC between April 12 and April 15, 1992, regional ground water flow throughout the North Central Industrial Park appears to extend east-southeast (Ref. 19). Localized ground water flow across the H & A Kaufman property is to the east (Ref. 19). Soil boring logs from the H & A Kaufman property indicate that depth to ground water ranges from approximately 2 to 10 feet (Ref. 11). Figure 5 illustrates the ground water elevations which existed on April 13, 1993 and the locations of TRCC ground water samples collected from May 24 through May 27, 1993 in the North Central Industrial Park.

Approximately 4,673 persons are served by drinking water drawn from public water supply sources within four miles of the H & A Kaufman property (Ref. 20). Approximately 5,532 persons are served by private drinking water wells within four miles of the property (Ref. 21). The nearest active private drinking water well screened in overburden is located approximately 1,800 feet southeast of the H & A Kaufman property (Ref. 4). The nearest active private drinking water well screened in bedrock is located approximately 2,056 feet southeast of the H & A Kaufman property (Ref. 4).



All or part of the following Rhode Island cities and towns are located within four miles of the H & A Kaufman property: Cumberland, Lincoln, Smithfield, North Smithfield, and North Providence, Rhode Island (Ref. 4,22). Private well user population is approximately 26 percent in the town of Lincoln; 43 percent in Cumberland; 39 percent in Smithfield; 79 percent in North Smithfield; and 0 percent in North Providence, Rhode Island (Ref. 21). The approximate percentage of people served by public water supplies in Lincoln is 74 percent; 57 percent in Cumberland; 61 percent in Smithfield; 21 percent in North Smithfield, and 100 percent in North Providence, Rhode Island (Ref. 20,21). The Scituate Reservoir is used as a public water supply source for the towns of Lincoln, Smithfield, and North Providence, Rhode Island and is not located within 15 downstream miles of the H & A Kaufman property (Ref. 21,22).

Water use values in the vicinity of the property were calculated as follows. Residential populations were estimated using U.S. Census Bureau population data and apportioning population by house counts from USGS quadrangles. In urban areas, on topographic maps where individual buildings are not represented, the area of private well service was multiplied by the town population density. Public water supplies were located on USGS quadrangles and service populations were apportioned based on available information. The remainder of populations not served by public water supplies were presumed to rely on private drinking water supplies.

Table 5 presents the population served by public ground water sources located within a four-mile radius of the H & A Kaufman property. Table 6 summarizes the estimated drinking water populations served by ground water sources within four miles of the property.

On December 29, 1989, Pare Engineering Corporation collected four ground water samples from monitoring wells OW-1, OW-2, OW-3, and OW-4 on the H & A Kaufman property (Ref. 11). The samples were analyzed by Eastern Scientific Associates of Brooklyn, Connecticut for VOCs according to EPA Method 624 and for EP Toxicity metals (Ref. 11). It is not known if the ground water samples were field filtered.

TABLE 5. PUBLIC GROUND WATER SUPPLY SOURCES WITHIN FOUR MILES OF THE H & A KAUFMAN REALTY CO. (LOT 62) PROPERTY

Distance/Direction from Property	Source Name	Location of Source	Estimated Population Served	Source Type
1.7 miles/Northeast	Autocrat, Inc.	Lincoln	80	Well type/screened interval unknown
1.8 miles/Northeast	Crest Mfg. Co.	Lincoln	45	Well type/screened interval unknown
2.2 miles/East	Quinville Well Field	Lincoln	Inactive due to contamination	Three overburden wells
2.5 miles/North	Woodland Convalescent Center	North Smithfield	40	Well type/screened interval unknown
3.1 miles/North	Town of Lincoln - Manville Wellfield	Lincoln	Inactive due to contamination	Three overburden wells
3.1 miles/Northwest	North Smithfield Elementary School	North Smithfield	520	Well type/screened interval unknown
3.3 miles/North	Cumberland Municipal Wellfield	Cumberland	3,858	Well type/screened interval unknown
3.5 miles/Southeast	Lonsdale Wellfield	Lincoln	Inactive - one well is available for standby use	Three wells; two screened in overburden
3.6 miles/West	Herbert Nursing Home	Smithfield	130	Two bedrock wells

(Ref. 4,20-33)

TABLE 6. ESTIMATED DRINKING WATER POPULATIONS SERVED BY GROUND WATER SOURCES WITHIN FOUR MILES OF THE H & A KAUFMAN REALTY CO. (LOT 62) PROPERTY

Radial Distance from H & A Kaufman (miles)	Estimated Population Served by Private Wells	Estimated Population Served by Public Wells	Total Estimated Population Served by Ground Water Sources Within the Ring
0.00 < 0.25	0	0	0
0.25 < 0.50	20	0	20
0.50 < 1.00	64	0	64
1.00 < 2.00	432	125	557
2.00 < 3.00	1,659	40	1,699
3.00 < 4.00	3,357	4,508	7,865
TOTAL	5,532	4,673	10,205

(Ref. 4,20-33)

Monitoring well OW-1 was installed on the southeast corner of the property to a depth of approximately 24 feet below grade; screen depth 10 feet (Ref. 1,11). Monitoring well OW-2 was installed on the northeast corner of the property to a depth of approximately 16 feet below grade; screen depth 10 feet (Ref. 1,11). Monitoring well OW-3 was installed northwest of the former flammable storage area to a depth of approximately 19 feet below grade; screen depth 10 feet (Ref. 1,11). Monitoring well OW-4 was installed on the southwest corner of the property to a depth of 15 feet below grade; screen depth 10 feet (Ref. 1,11). All of the monitoring wells installed on the H & A Kaufman property were completed in overburden (Ref. 11). A summary of the ground water analytical results for samples collected by Pare Engineering Corporation in December 1989 is presented in Table 7. Complete analytical results and quantitation limits are presented in Appendix A.

TABLE 7. SUMMARY OF ANALYTICAL RESULTS: Ground Water Samples Collected by Pare Engineering in December 1989			
Sample Location No.	Compound/Element	Concentration	Detection Limit
OW-1	1,1-dichloroethane	7.0 µg/L	0.50 µg/L
	barium	0.413 mg/L	0.005 mg/L
OW-2	1,1-dichloroethane	3.3 µg/L	0.50 µg/L
	barium	0.028 mg/L	0.005 mg/L
OW-3	1,1-dichloroethane	ND	0.50 µg/L
	barium	1.26 mg/L	0.005 mg/L
OW-4	1,1-dichloroethane	6.0 µg/L	0.50 µg/L
	1,1,1-trichloroethane	11.0 µg/L	0.50 µg/L
	barium	0.631 mg/L	0.005 mg/L

Note: Locations of monitoring wells are depicted on Figure 3.

µg/L - micrograms per liter

mg/L - milligrams per liter

ND - Not Detected

(Ref. 11)

On May 24, 1993, TRCC collected two unfiltered ground water samples from onsite monitoring well OW-3 and a trip blank sample for quality control purposes. TRCC was

unable to locate monitoring wells OW-1, OW-2, and OW-4 during site reconnaissance activities (Ref. 2). Ground water can be described as silty (Ref. 2). All samples were analyzed for TCL VOCs; SVOCs, which include BNAs, pesticides and PCBs; and TAL inorganics and cyanide through the CLP under RAS Case Number 20060 (Ref. 12).

TRCC also collected unfiltered ground water samples from an active private drinking water well completed in overburden (76 Wilbur Road) and from an active private drinking water well completed in bedrock (75 Wilbur Road). The drinking water wells are located approximately 1,800 feet and 2,056 feet southeast of the H & A Kaufman property, respectively. The private well samples were analyzed for TCL low concentration method VOCs through the CLP Special Analytical Services (SAS) Case Number 7804A/20063. These samples were also analyzed for SVOCs including BNAs and pesticides/PCBs, and TAL inorganics and cyanide through the CLP RAS Case Number 20060 (Ref. 12).

A summary of the ground water samples collected by TRCC is presented in Table 8; the complete analytical results are presented in Appendix E. Table 9 is a summary of the compounds and elements detected in ground water samples from the H & A Kaufman property. Ground water samples GW-96-13 (49) and GW-96-14 (48) were selected as the overburden and bedrock ground water reference samples, respectively. Samples GW-96-13 (49) and GW-96-14 (48) were collected from monitoring wells MW-4 and the bedrock monitoring well at location TW-4 located on the Speidel Company/Gorham Company property (Figure 2, Lots 50, 95, and 96). Both ground water monitoring well locations are located upgradient and approximately 0.35 miles southwest of the H & A Kaufman property.

Inclusion of a compound or element in Table 9 is based upon its detection at concentrations equal to or greater than three times the concentration of the same compound or element detected in a reference sample. If the compound or element was not detected in the reference sample, then concentrations are compared with CRQLs or CRDLs. A constituent is listed in Table 9 if it was detected at concentrations equal to or exceeding CRQLs or CRDLs. Compounds and elements listed on Table 9 are referred to in this report as exceeding reference values.

TABLE 8. SAMPLE SUMMARY: H & A KAUFMAN REALTY CO. (LOT 62) PROPERTY Ground Water Samples Collected by TRCC on May 24, 1993				
Sample Location No.	Traffic Report No.	Time/ Date	Remarks	Sample Source
MATRIX: Aqueous				
GW-96-13 (49)	AEH65 MACD75	1400 5/26/93	Grab	Overburden ground water reference sample collected from monitoring well MW-4 on Speidel Company/Gorham Company property.
GW-96-14 (48)	AEH66 MACD76	1150 5/26/93	Grab	Bedrock ground water reference sample collected from the bedrock monitoring well at location TW-4 on Speidel Company/Gorham Company property.
GW-93-16 (42)	ADC99 MABF66	1300 5/24/93	Grab	Collected from monitoring well OW-3, located in the northwestern corner of property.
GW-93-17 (43)	ADD00 MABF67	1400 5/24/93	Grab	Duplicate sample of GW-93-16 collected for quality control.
PW-03 (57)	SAO366 AEH83 MACD23	1600 5/27/93	Grab	Private bedrock drinking water well located at 75 Wilbur Road.
PW-04 (56)	SAO367 ABN98 MACD25	1700 5/27/93	Grab	Private overburden drinking water well located at 76 Wilbur Road.

(#) - Figure 5 legend number

(Ref. 2)

TABLE 9. SUMMARY OF ANALYTICAL RESULTS: GROUND WATER SAMPLE ANALYSIS FOR H & A KAUFMAN REALTY CO. (LOT 62) PROPERTY

Sample Location No.	Compound/Element	Concentration	Reference Concentration	Comments
GW-93-16 (42)	calcium magnesium nickel sodium	22,800 µg/L 6,920 µg/L 129 µg/L 14,300 J µg/L	2,660 µg/L 1,260 µg/L 40 µg/L 3,070 J µg/L	8.5 × Ref. 5.4 × Ref. 3.2 × CRDL 4.6 × Ref.
GW-93-17 (43) (dup. of GW-93-16)	arsenic calcium chromium lead magnesium nickel sodium	9.9 J µg/L 23,700 µg/L 31.4 µg/L 16.4 J µg/L 6,200 µg/L 128 µg/L 14,000 J µg/L	2.8 J µg/L 2,660 µg/L 10 µg/L 3 µg/L 1,260 µg/L 40 µg/L 3,070 J µg/L	3.5 × Ref. 8.9 × Ref. 3.1 × CRDL 5.4 × CRDL 4.9 × Ref. 3.2 × CRDL 4.5 × Ref.
PW-03 (57)	sodium	22,800 J µg/L	2,980 J µg/L	7.7 × Ref.
PW-04 (56)	1,1,1-trichloroethane copper sodium	2.8 µg/L 115 µg/L 14,600 J µg/L	1 µg/L 17 µg/L 3,070 µg/L	2.8 × CRQL 6.8 × Ref. 4.8 × Ref.

µg/L - micrograms per liter

J - Value is an estimated quantity

CRDL - Contract Required Detection Limit

CRQL - Contract Required Quantitation Limit

Ref. - Reference value

(#) - Figure 5 legend number

No VOCs or SVOCs were present at concentrations exceeding reference criteria in ground water samples GW-93-16 (42) and GW-93-17 (43) collected from the H & A Kaufman property. The VOCs 1,1-dichloroethane, 1,1-dichloroethene, and 1,1,1-trichloroethane were present at concentrations below the CRQL of 10 µg/L. Seven inorganic compounds were present in concentrations exceeding reference values in samples GW-93-16 (42) and GW-93-17 (43). Concentrations ranged from 9.9 µg/L arsenic (GW-93-17) to 23,700 µg/L calcium (GW-93-17). In addition, chromium was detected above the CRDL in ground water sample GW-93-17 (43) at 31.4 µg/L; however, it should be noted that the ground water

withdrawn at GW-93-17 (43) was turbid. Turbid samples tend to contain elevated concentrations of inorganics due to the tendency of the elements to adhere to suspended particles.

No VOCs or pesticide/PCB compounds were present in the private bedrock drinking water well sample PW-03 (57). Di-n-butylphthalate was present at 1 µg/L, below the CRQL value of 10 µg/L. One inorganic compound, sodium, was present above reference criteria in sample PW-03 (57) at a concentration of 22,800 µg/L.

One VOC, 1,1,1-trichloroethane, was present at a concentration exceeding the reference value in the overburden private drinking water well sample PW-04 (56). 1,1,1-Trichloroethane was detected in sample PW-04 (56) at a concentration of 2.8 µg/L; the CRQL for 1,1,1-trichloroethane is 1 µg/L. In addition, 1,1,2-trichloroethane was detected in sample (PW-04) (56) at 0.54 µg/L; below the CRQL value of 10 µg/L. There is no record of 1,1,1-trichloroethane use or storage at the H & A Kaufman property. This sample location is hydraulically downgradient of Speidel Company/Gorham Company, Lincoln Dimensional Tube, and International Data Sciences, Inc. where the former use of 1,1,1-trichloroethane has been documented (Ref. 10,34).

No BNA or pesticide/PCB compounds were identified at concentrations exceeding CRQLs in sample PW-04 (56). Two SVOCs, diethylphthalate and di-n-butylphthalate, were detected in sample PW-04 (56) at 1 µg/L, below the CRQL value of 10 µg/L. Two inorganic elements, copper and sodium, were detected above CRDLs in sample PW-04 (56) at concentrations of 115 µg/L and 14,600 µg/L, respectively.

6.0 SURFACE WATER PATHWAY

The H & A Kaufman property is located outside the floodplain boundaries of the Moshassuck River (Ref. 1). According to the Federal Emergency Management Agency (FEMA) the property is classified as Zone C; areas which lie between the 100- and 500-year

floodplain (Ref. 35). The H & A Kaufman property is located within the Narragansett Bay Drainage Basin (Ref. 14).

Surface water runoff from the H & A Kaufman property collects in a drainage channel located along Powder Hill Road (Ref. 2). Surface water in the drainage channel flows through a culvert under Powder Hill Road to an area of standing water located on the property east of Powder Hill Road (Ref. 2). This property is currently owned by the Carol Cable Co. (CERCLIS No. RID000791657) (Ref. 9). Surface water runoff in the vicinity of the standing water flows to a drainage channel located along Carol Drive (Ref. 2). The drainage channel then discharges to a catch basin located near the intersection of Carol Drive and Wellington Road (Ref. 2). The catch basin discharges via underground pipes to an unnamed stream approximately 20 yards northeast-east of Wellington Road (Ref. 2).

The unnamed stream is the end point of the storm water system for the North Central Industrial Park, and therefore receives drainage water originating from other areas in the industrial park. The storm water system extends along Wellington Road and Carol Drive. TRCC observed surface water catch basins located along each side of Wellington Road. The unnamed stream is the probable point of entry (PPE) for surface water originating from the H & A Kaufman property.

The unnamed stream flows approximately 1.7 miles northeast to a swampy area that subsequently feeds the Moshassuck River (Ref. 4,36). The Moshassuck River flows approximately 7.9 miles south before discharging to the Providence River and Providence Harbor (Ref. 4,30-33,36). The terminus of the 15-mile surface water pathway is near Colt State Park in Barrington, Rhode Island (Ref. 30-33,36).

The Moshassuck River is classified by the state of Rhode Island as an active fishery (Ref. 37). Several species of freshwater fish, including trout, are harvested by sport fishermen in the Moshassuck River (Ref. 38). The average flow rate of the Moshassuck River is 40.8 cubic feet per second (cfs) (Ref. 38). Providence River, Providence Harbor, and Narragansett Bay are tidally influenced (Ref. 39). Narragansett Bay is used for both

commercial and recreational fishing and shellfishing, leisure boating, bathing (southern shores), and commercial shipping (Ref. 39). According to the Atlantic Coast Ecological Inventory Map for Rhode Island, shellfishing in Providence Harbor is closed (Ref. 39). Shellfishing in Narragansett Bay within 15 downstream miles of the H & A Kaufman property is seasonally or conditionally closed during certain times of the year (Ref. 39). No drinking water intakes were identified within 15 downstream miles of the H & A Kaufman property (Ref. 20,21).

Lime Rock Preserve is located within 15 downstream miles of the H & A Kaufman property, approximately 0.9 miles east-southeast (Ref. 40,41). The preserve is an ecologically significant natural community, supporting approximately 10 state endangered or threatened plant species (Ref. 41).

Approximately 0.23 miles of wetland frontage exist along the unnamed stream and approximately 2.7 miles exist along the Moshassuck River (Ref. 42,43,44). There are no vegetated wetlands located in Providence River, Providence Harbor or Narragansett Bay (Ref. 42,43,44). All wetlands located within 15 downstream miles of the H & A Kaufman property are designated as palustrine (Ref. 42,43,44). Table 10 presents water bodies within 15 downstream miles of the H & A Kaufman property.

On December 29, 1989, Pare Engineering Corporation collected two surface water samples from drainage channels located on the H & A Kaufman property. The exact locations of the surface water samples collected by Pare Engineering Corporation were not included in the report. The samples were analyzed by Eastern Scientific Associates of Brooklyn, Connecticut for VOCs according to EPA Method 624 and for EP Toxicity metals (Ref. 11). A summary of the surface water analytical results are presented in Table 11. Complete analytical results and quantitation limits are presented in Appendix A.

On November 23, 1992, Georges Bockstael collected a surface water sample and soil sample from the drainage channel located west of the former flammable storage area. The exact locations of the surface water and soil samples were not available in the file information. The samples were analyzed by R.I. Analytical Laboratories, Inc. of Warwick, Rhode Island for VOCs according to EPA Methods 601/602 and 8010/8020.

TABLE 10. WATER BODIES WITHIN THE SURFACE WATER SEGMENT OF THE H & A KAUFMAN REALTY CO. (LOT 62) PROPERTY				
Surface Water Body	Descriptor	Length of Reach	Flow Characteristics (cfs) ^a	Length of Wetlands
Unnamed Stream	Minimal Stream	1.7 miles	< 10	0.23 miles
Moshassuck River	Small to Moderate Stream	7.9 miles	40.8	2.7 miles
Providence River/ Providence Harbor	Coastal Tidal Waters	2.3 miles	NA	0 miles
Narragansett Bay	Coastal Tidal Waters	3.1 miles	NA	0 miles

NA - Not Applicable

^acubic feet per second

(Ref. 36,37,38,39,42,43,44,45)

TABLE 11. ANALYTICAL RESULTS: Surface Water Samples Collected by Pare Engineering Corp. in December 1989			
Sample Location No.	Compound/Element	Concentration	Detection Limits
SW-1	1,1-dichloroethane	30 µg/L	0.50 µg/L
	1,1,1-trichloroethane	0.56 µg/L	0.50 µg/L
	barium	0.122 mg/L	0.005 mg/L
SW-2	1,1-dichloroethane	ND	0.50 µg/L
	1,1,1-trichloroethane	7.2 µg/L	0.50 µg/L
	barium	0.023 mg/L	0.005 mg/L

Note: Specific sampling locations for surface water samples SW-1 and SW-2 were not available.

µg/L - micrograms per liter

mg/L - milligrams per liter

ND - Not Detected

(Ref. 11)

1,1-Dichloroethene, 1,1-dichloroethane, and 1,1,1-trichloroethane were detected above method detection limits in the surface water sample. No VOCs were present in the soil sample.

Total Petroleum Hydrocarbons (TPH) were detected in the soil sample at 63.6 mg/kg.

On May 24, 1993, TRCC collected five sediment samples and one soil sample along the surface water pathway of the H & A Kaufman property. Figure 6 illustrates the approximate locations of all the surface water pathway samples collected by TRCC in the North Central Industrial Park. Sediment and soil samples discussed in this section are referred to by the TRCC sample location number and the Figure 6 legend sample number. The Figure 6 legend sample number will follow TRCC's sample location number.

Sediment sample SD-93-03 (59), collected from a drainage channel west of the onsite building and upstream of the outfall pipe located in the southwestern corner of the property, was selected as the sediment reference sample for samples SD-93-01 (61), SD-93-06 (62), SD-93-09 (63). Sediment samples are described as brown sand and silt with some organics (Ref. 2).

Sample RS-01 (1) (Figure 4), collected from an apparently undisturbed area approximately 1,800 feet northwest of the H&A Kaufman property was selected as the reference sample for soil sample SS-91-12 (69). Sample SS-91-12 (69) was collected from a point bar (depositional feature) in the stream bed of the unnamed stream located in the Lime Rock Preserve, approximately 0.9 miles east-southeast of the H & A Kaufman property. This location was selected due to the lack of sediment in the stream bed during sampling activities. During high water periods, the area from which sample SS-91-12 (69) was collected would be saturated, and thus classified as a sediment (Ref. 2).

Sediment samples SD-93-01 (61), SD-93-03 (59), SD-93-06 (62), and SD-93-09 (63), and soil sample SS-91-12 (69) are described as brown sand and silt with some organics (Ref. 2). Soil sample RS-01 (1) is described as gray to brown fine sand and silt (Ref. 2).

Table 12 presents a summary of the sediment and soil samples collected by TRCC. All samples were analyzed for TCL VOCs; SVOCs, including BNAs and pesticides/PCB

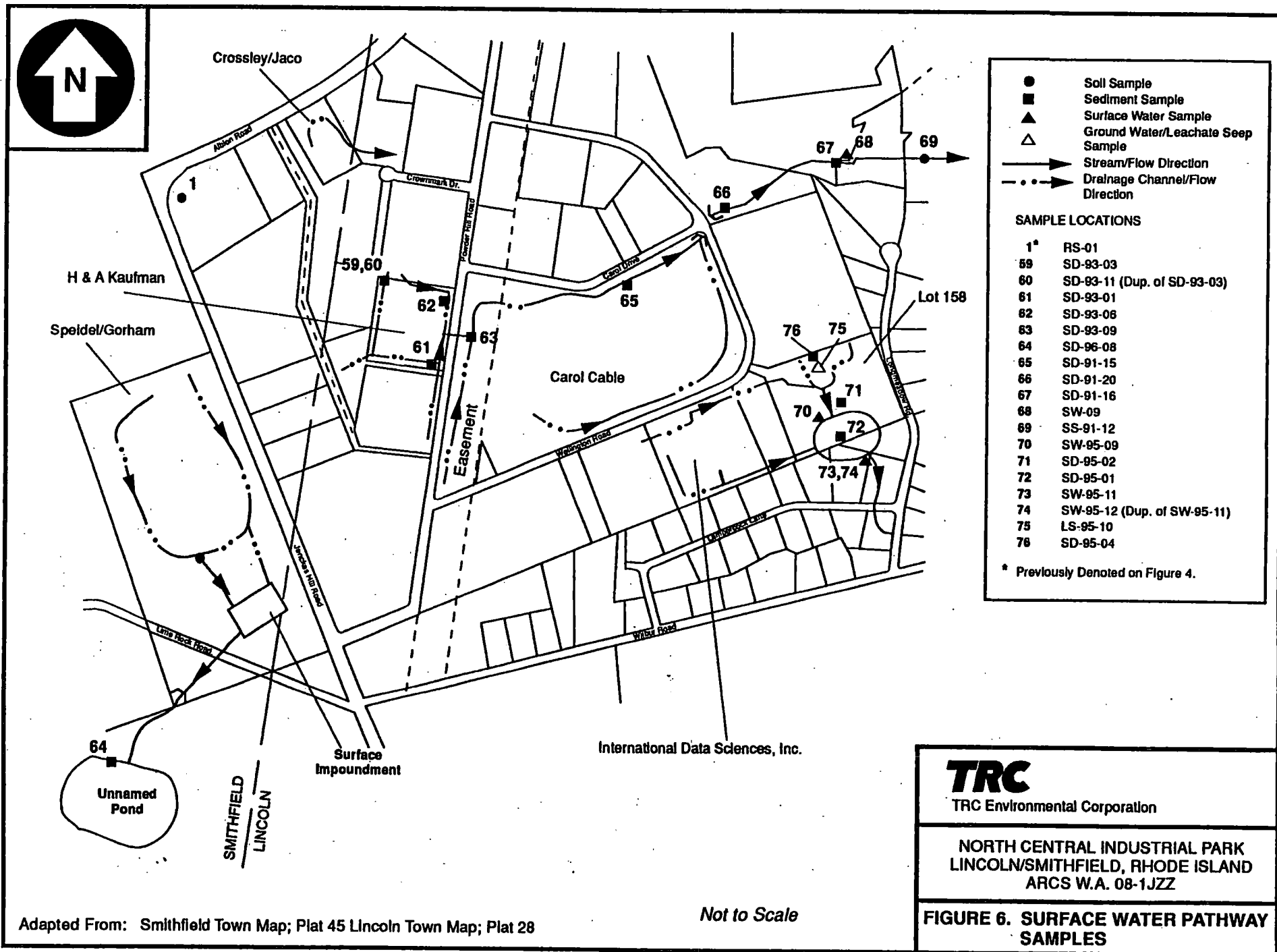


TABLE 12. SAMPLE SUMMARY: H & A KAUFMAN REALTY CO. (LOT 62)
Sediment and Soil Samples Collected by TRCC on May 24, 1993

Sample Location No.	Traffic Report No.	Time/ Date	Remarks	Sample Source
MATRIX: Sediment				
SD-93-01 (61)	ADC64 MABF00	1910 5/24/93	Grab 0-6"	Sediment sample collected from drainage channel south of H & A Kaufman property.
SD-93-03 (59)	ADC42 MABF02	2015 5/24/93	Grab 0-6"	Reference sediment sample collected upgradient of outfall pipe in drainage channel on western side of property.
SD-93-06 (62)	AFG10 MABF21	1915 5/24/93	Grab 0-6"	Sediment sample collected downstream of outlet pipe; located adjacent to northwestern driveway.
SD-93-09 (63)	AFG13 MABF24	1855 5/24/93	Grab 0-6"	Downstream sediment sample collected on Blackstone Valley Electric property.
SD-93-11 (60)	AFG15 MABF26	2020 5/24/93	Grab 0-6"	Duplicate sample of SD-93-03 collected for quality control.
MATRIX: Soil				
RS-01 (1)	AEH41 MACD48	0950 5/27/93	0-6" Grab	Reference soil sample collected approximately 1,800 feet northwest of H&A Kaufman Property.
SS-91-12 (69)	AEH28 MACD86	1125 5/24/93	Grab 0-6"	Collected from unnamed stream bed in Lime Rock Preserve.

NA - Not Applicable

(#) - Figure 6 Legend Number

(Ref. 2)

compounds; and TAL inorganics and cyanide through the CLP under RAS Case Number 20060.

Complete analytical results of TRCC's sampling activities are presented in Appendix E. Table 13 presents the compounds and elements detected in the sediment and soil samples collected by TRCC. Inclusion of a compound or analyte in Table 13 is based upon its detection at concentrations equal to or greater than three times the concentration of the same compound or element detected in the reference sample. If a compound or element

**TABLE 13. SUMMARY OF ANALYTICAL RESULTS: SEDIMENT AND SOIL
SAMPLE ANALYSIS FOR H & A KAUFMAN REALTY CO. (LOT 62) PROPERTY**

Sample Location No.	Compound/Element	Concentration		Reference Concentration		Comments		
SD-93-01 (61)	acenaphthene	400	J	µg/kg	330	µg/kg	1.2 × CRDL	
	fluorene	420	J	µg/kg	330	µg/kg	1.3 × CRDL	
	phenanthrene	7,000		µg/kg	330	µg/kg	21 × CRDL	
	carbazole	1,000	J	µg/kg	330	µg/kg	3.0 × CRDL	
	fluoranthene	1,300	J	µg/kg	330	µg/kg	3.9 × CRDL	
	pyrene	10,000		µg/kg	330	µg/kg	30 × CRDL	
	benzo(a)anthracene	8,200		µg/kg	330	µg/kg	25 × CRDL	
	chrysene	4,100		µg/kg	330	µg/kg	12 × CRDL	
	benzo(b)fluoranthene	4,300		µg/kg	330	µg/kg	13 × CRDL	
	benzo(k)fluoranthene	7,800		µg/kg	330	µg/kg	24 × CRDL	
	benzo(a)pyrene	3,400		µg/kg	330	µg/kg	10 × CRDL	
	indeno(1,2,3-cd)pyrene	3,200		µg/kg	330	µg/kg	9.6 × CRDL	
	dibenz(a,h)anthracene	730	J	µg/kg	330	µg/kg	2.2 × CRDL	
	benzo(g,h,i)perylene	3,200		µg/kg	330	µg/kg	9.6 × CRDL	
	4,4'-DDD	3.5	J	µg/kg	3.3	µg/kg	1.0 × CRDL	
	chromium	41		mg/kg	5.9	mg/kg	6.9 × Ref.	
	lead	31.6	J	mg/kg	5.8	mg/kg	5.4 × Ref.	
nickel	11.6		mg/kg	8	mg/kg	1.4 × CRDL		
SD-93-06 (62)	acenaphthene	840		µg/kg	330	µg/kg	2.5 × CRDL	
	dibenzofuran	420	J	µg/kg	330	µg/kg	1.2 × CRDL	
	fluorene	1,000		µg/kg	330	µg/kg	3.0 × CRDL	
	phenanthrene	10,000		µg/kg	330	µg/kg	30 × CRDL	
	anthracene	1,500		µg/kg	330	µg/kg	4.5 × CRDL	
	carbazole	1,400		µg/kg	330	µg/kg	4.2 × CRDL	
	fluoranthene	16,000		µg/kg	330	µg/kg	48 × CRDL	
	pyrene	11,000		µg/kg	330	µg/kg	33 × CRDL	
	benzo(a)anthracene	6,500		µg/kg	330	µg/kg	20 × CRDL	
	chrysene	6,900		µg/kg	330	µg/kg	21 × CRDL	
	bis(2-ethylhexyl)phthalate	230	J	µg/kg	43	J	µg/kg	5.3 × Ref.
	di-n-octylphthalate	690		µg/kg	330	µg/kg	2.0 × CRDL	
	benzo(b)fluoranthene	13,000		µg/kg	330	µg/kg	39 × CRDL	
	benzo(k)fluoranthene	13,000		µg/kg	330	µg/kg	39 × CRDL	
	benzo(a)pyrene	5,500		µg/kg	330	µg/kg	17 × CRDL	
	indeno(1,2,3-cd)pyrene	1,800		µg/kg	330	µg/kg	5.4 × CRDL	
	dibenz(a,h)anthracene	480		µg/kg	330	µg/kg	1.4 × CRDL	
	benzo(g,h,i)perylene	1,400		µg/kg	330	µg/kg	4.2 × CRDL	
	iron	21,400		mg/kg	6,720	mg/kg	3.2 × Ref.	
	lead	26.7	J	mg/kg	5.8	mg/kg	4.6 × Ref.	
	manganese	3,480		mg/kg	113	mg/kg	31 × Ref.	
SD-93-09 (63)	fluoranthene	770		µg/kg	330	µg/kg	2.3 × CRDL	
	pyrene	470	J	µg/kg	330	µg/kg	1.4 × CRDL	
	chrysene	380	J	µg/kg	330	µg/kg	1.1 × CRDL	
	benzo(b)fluoranthene	890		µg/kg	330	µg/kg	2.7 × CRDL	
	benzo(k)fluorathene	890		µg/kg	330	µg/kg	2.7 × CRDL	

TABLE 13. (CONTINUED)

Sample Location No.	Compound/Element	Concentration	Reference Concentration	Comments
SS-91-12 (69)	4,4'-DDE	9.8 µg/kg	0.58 µg/kg	17 × Ref.
	beryllium	1.3 J mg/kg	0.29 mg/kg	4.4 × Ref.
	calcium	2,240 mg/kg	230 J mg/kg	9.7 × Ref.
	cobalt	11.3 mg/kg	10 mg/kg	1.1 × CRDL
	magnesium	4,150 mg/kg	243 mg/kg	17 × Ref.
	manganese	935 mg/kg	17.3 mg/kg	54 × Ref.
	nickel	13.1 mg/kg	8 mg/kg	1.6 × CRDL
	selenium	1.0 mg/kg	1 mg/kg	1.0 × CRDL
	zinc	39.1 J mg/kg	8.8 mg/kg	4.4 × Ref.

mg/kg - milligrams per kilogram

µg/kg - micrograms per kilogram

J - Value is an estimated quantity

Ref. - Reference Sample

CRDL - Contract Required Detection Limit

CRQL - Contract Required Quantitation Limit

(#) - Figure 6 legend number

was not detected in the reference sample, then concentrations are compared with the CRQLs or CRDLs. A constituent is listed in Table 13 if it was detected at concentrations equal to or exceeding CRQLs or CRDLs. Compounds and elements listed on Table 13 are referred to in this report as exceeding reference values.

No VOCs were detected in sediment samples SD-93-01 (61), SD-93-06 (62), and SD-93-09 (63). The most common SVOCs detected in sediment samples were PAHs. Sample SD-93-01 (61) contained 13 PAHs at concentrations ranging from 400 µg/kg (acenaphthene) to 10,000 µg/kg (pyrene). Sample SD-93-09 (63) contained five PAHs at concentrations ranging from 380 µg/kg (chrysene) to 890 µg/kg (benzo[b]fluoranthene and benzo[k]fluoranthene). The most abundant PAHs were detected in sample SD-93-06 (62) collected from a drainage channel located on the eastern side of the property, downstream of an outfall pipe. The origin of the outfall pipe is not known.

Sixteen PAHs were detected exceeding reference values in sample SD-93-06 (62).

Fluoranthene (16,000 µg/kg), benzo(b)fluoranthene (13,000 µg/kg), and benzo(k)fluoranthene (13,000 µg/kg) were the most abundant PAHs detected in SD-93-06 (62).

The high concentrations of PAHs detected in sediment samples collected from drainage channels located on the H & A Kaufman property and adjacent properties could be directly related to the close proximity of Powder Hill Road to these sample locations. PAHs can be generated by the combustion of petroleum products (Ref. 13).

The only pesticide detected at concentrations exceeding reference values in sediment samples SD-93-01 (61), SD-93-06 (62), and SD-93-09 (63) was 4,4'-DDD, which was detected in SD-93-01 (61) at 3.5 µg/kg. Six pesticides, alpha-BHC, heptachlor epoxide, endrin, 4,4'-DDT, endrin ketone, and endrin aldehyde, were detected in sample SD-93-06 (62) at concentrations below reference values. Five pesticides, heptachlor epoxide, dieldrin, 4,4'-DDE, alpha chlordane, and gamma chlordane, were detected in sample SD-93-09 (63) at concentrations below reference values. No PCBs were present in samples SD-93-01 (61), SD-93-06 (62) and SD-93-09 (63).

Chromium, nickel, and lead were detected in sample SD-93-01 (61) at 41 mg/kg, 11.6 mg/kg, and 31.6 mg/kg, respectively. Three inorganic elements, iron, lead, and manganese, were detected in sample SD-93-06 (62) at 21,400 mg/kg, 26.7 mg/kg, and 3,480 mg/kg, respectively. No inorganic elements were detected at concentrations exceeding reference values in sample SD-93-09 (63).

No VOCs or SVOCs were detected above CRQLs in soil sample SS-91-12 (69). The pesticide 4,4'-DDE was present at 9.8 µg/kg. In addition, four pesticides, Endosulfan II, 4,4'-DDT, methoxylor, and gamma chlordane, were detected at concentrations below reference values in sample SS-91-12 (69). Eight inorganic elements, beryllium, calcium, cobalt, magnesium, manganese, nickel, selenium, and zinc, were detected in soil sample SS-91-12 (69) above CRDLs. Inorganic concentrations ranged from 1.0 mg/kg (selenium) to 4,150 mg/kg (manganese).

7.0 SOIL EXPOSURE PATHWAY

The H & A Kaufman property is currently inactive (Ref. 2). Approximately 75 percent of the property is covered by a structure or pavement (Ref. 2). Engineered Wall Systems and Paramount Press are the only active facilities located within 200 feet of the property (Ref. 2). Engineered Wall Systems employs approximately 22 people and is located west of the H & A Kaufman property (Lot 145) (Ref. 46). Paramount Press is located south of the H & A Kaufman property and employs approximately 45 people (Ref. 46). Engineered Wall Systems and Paramount Press are not located within 200 feet of areas of observed contamination on the H & A Kaufman property (Ref. 2).

TRCC observed one area of stained soil/sediments in the drainage channel located on the northern side of the property (Ref. 2). The staining was in the course of the drainage pathway and was observed to a depth of 2 to 3 inches below the ground surface (Ref. 2). The area of staining was approximately 20 feet by 20 feet (Ref. 2). TRCC was unable to collect a sediment sample in the vicinity of the staining due to the large amounts of organic matter in the sediments.

Vehicular and pedestrian access to the property is unrestricted (Ref. 2). The nearest residence is located approximately 1,800 feet to the south (Ref. 2). Approximately 396 people live within a one-mile radius of the property (Ref. 4,21-33). There are no daycare facilities or schools within 200 feet of an area of significant contamination on the H & A Kaufman property (Ref. 2). There are no terrestrial sensitive environments located on the property (Ref. 40).

8.0 AIR PATHWAY

All or part of the following Rhode Island cities and towns are located within four miles of the H & A Kaufman property: Lincoln, Smithfield, North Smithfield, Cumberland, and North Providence, Rhode Island (Ref. 21). There are approximately 17,137 people living within a

four-mile radius of the H & A Kaufman property (Ref. 21-33). The nearest residence is located approximately 1,800 feet south of the property (Ref. 2).

Approximately 187 acres of wetland are located within one mile of the H & A Kaufman property (Ref. 42). Lime Rock Preserve is located approximately 0.9 miles east-southeast of the property. The preserve is a unique habitat which supports approximately 10 state endangered or threatened plant species (Ref. 41).

Table 14 summarizes the population distribution within four miles of the H & A Kaufman property.

TABLE 14. ESTIMATED POPULATION WITHIN FOUR MILES OF THE H & A KAUFMAN REALTY CO. (LOT 62) PROPERTY	
Radial Distance from H & A Kaufman (miles)	Estimated Population
0.00 < 0.25	0
0.25 < 0.50	76
0.50 < 1.00	320
1.00 < 2.00	1,393
2.00 < 3.00	4,433
3.00 < 4.00	10,915
TOTAL	17,137

(Ref. 20)

9.0 SUMMARY

The H & A Kaufman Realty Co. (Lot 62) property is located on Powder Hill Road in the North Central Industrial Park, Lincoln, Rhode Island. The property is 5.0 acres in size and is designated as Lot 62 on Plat 28 in the Lincoln Tax Assessor's Office. The property is bordered to the east by Powder Hill Road; to the south by Paramount Press, Inc. (Lot 63), a

commercial printing facility; to the north by a vacant building formerly occupied by Second Chase Venture, Chase Brass and Copper Co., and Globe Distributing, Inc. (Lot 61); and to the west by Engineered Wall Systems (Lot 145) and Goodyear Steel Container (Lot 87), a prefabricator of exterior wall panels and a metals fabricator, respectively.

From 1968 to 1990, Globe Distributing, Inc. utilized the property as a temporary storage and distribution facility for assorted pre-packaged items such as automotive and hardware parts and lawn and garden supplies. A review of Rhode Island Department of Environmental Management (RIDEM) and EPA files found no records documenting the disposal of, use, or storage of potentially hazardous substances on the H & A Kaufman property. Prior to 1968, the property was undeveloped woodland. The property is currently inactive.

One single-story building, approximately 120,000 square feet in size, is located on the property. Five floor drains (Nos. 1-5) and a curtain drain (No. 6) are located inside the H & A Kaufman building. The terminus of the building's drains are not known. During TRCC's sampling activities at the H & A Kaufman property, organic vapors were detected in floor drain No. 4 located in the former flammable storage area of the building. A reading of 7 parts per million (ppm) was detected on an Organic Vapor Analyzer (OVA). Information regarding the types of materials and quantities of materials stored in the former flammable storage area is not known. TRCC did not observe staining on the concrete floor inside the H & A Kaufman building. The building is currently vacant.

Two active USTs containing No. 2 fuel oil are located on the southern and eastern sides of the building. In November 1992, the structural integrity of the USTs was tested by Whitco Testing, Inc. Both USTs were found to be in compliance with state regulations.

Drainage channels are located parallel to the north, southeast, and west sides of the property. These drainage channels receive surface water runoff from the western, northern, and southern sides of the building, as well as from properties located north, south, and west of the H & A Kaufman property. Surface water runoff from the drainage channels located on the property flows east into a drainage channel which runs parallel to Powder Hill Road.

During the site reconnaissance, TRCC observed two ground water/leachate seeps on the western and eastern sides of the property. In addition, TRCC personnel observed an outfall pipe discharging to the drainage channel located south of the H & A Kaufman building. The outfall pipe appears to originate from one of the properties located west of the H & A Kaufman property. According to past studies, water discharged from the outfall pipe is warmer than surface water in other drainage channels located on the property. A second outfall pipe was observed by TRCC in the drainage channel located east of the H & A Kaufman building. The origin of the outfall pipe is not known. TRCC did not observe stained sediments in the vicinity of the outfall pipes.

An area of stained soil/sediments was observed by TRCC personnel in the drainage channel located on the northern side of the property. The stained area covered approximately 400 square feet. Bright orange sediments and orange colored surface water were visible in the drainage channel. TRCC did not detect elevated organic vapor readings on the OVA in the vicinity of the stained sediments.

On May 24, 1993, TRCC collected soil, sediment, ground water, leachate and surface water samples from the H & A Kaufman property and adjacent properties in the North Central Industrial Park. In addition, floor drain sample DS-93-12 (11) was collected from floor drain No. 4 located in the former flammable storage area of the building. Three volatile organic compounds (VOCs), acetone, toluene, and xylenes (total), were detected above Contract Required Quantitation Limits (CRQLs) in the floor drain sample. Four pesticides were detected at concentrations below CRQLs in sample DS-93-12 (11). No semi-volatile organic compounds (SVOCs) were detected exceeding CRQLs in sample DS-93-12 (11). In addition, inorganic elements, aluminum, calcium, copper, iron, lead, manganese, potassium, sodium, and zinc were present above Contract Required Detection Limits (CRDLs) in sample DS-93-12 (11).

No VOCs or SVOCs were detected exceeding CRQLs in sample LS-93-07 (9) and its duplicate LS-93-08 (10). Samples LS-93-07 (9) and LS-93-08 (10) were collected from a ground water/leachate seep located east of the H & A Kaufman building. 1,1-Dichloroethane

and 1,1,1-trichloroethane were present in both samples at concentrations below the CRQL of 10 micrograms per liter ($\mu\text{g/L}$). Four inorganic elements, calcium, iron, manganese, and sodium were present above CRDLs in samples LS-93-07 (9) and LS-93-08 (10).

No VOCs or SVOCs were present above CRQLs in ground water samples GW-93-16 (42) and its duplicate GW-93-17 (43). 1,1-Dichloroethane, 1,1-dichloroethene, and 1,1,1-trichloroethane were detected at concentrations below the CRQL of 10 $\mu\text{g/L}$. Samples GW-93-16 (42) and GW-93-17 (43) were collected from monitoring well OW-3 located on the H & A Kaufman property. The following inorganic elements were detected in samples GW-93-16 (42) and GW-93-17 (43) exceeding reference criteria: calcium, magnesium, nickel, sodium, arsenic, chromium, and lead. In addition, chromium was detected in sample GW-93-17 (43) at 31.4 $\mu\text{g/L}$. The CRDL for chromium is 10 $\mu\text{g/L}$.

One VOC, 1,1,1-trichloroethane, was present at a concentration exceeding the reference value in the private overburden drinking water well sample, PW-04 (56), located at 76 Wilbur Road. The VOC, 1,1,1-trichloroethane, was detected in sample PW-04 (56) at a concentration of 2.8 $\mu\text{g/L}$; above the CRQL value of 1 $\mu\text{g/L}$. In addition, 1,1,2-trichloroethane was detected at 0.54 $\mu\text{g/L}$; below the CRQL of 10 $\mu\text{g/L}$. No VOCs were detected in the private bedrock drinking water well sample, PW-03 (57), located at 75 Wilbur Road. There is no record of 1,1,1-trichloroethane use or storage at the H & A Kaufman property. Sample location PW-04 (56) is located hydraulically downgradient of Speidel Company/Gorham Company, Lincoln Dimensional Tube, and International Data Sciences, Inc. where the former use of 1,1,1-trichloroethane has been documented.

Two inorganic elements, copper and sodium, were detected in sample PW-04 (56) exceeding reference criteria. In addition, sodium was also detected in the private bedrock drinking water well sample PW-03 (57) above reference criteria. No SVOCs were detected exceeding reference criteria in samples PW-03 (57) and PW-04 (56).

No VOCs were detected exceeding reference criteria in soil and sediment samples collected from the H & A Kaufman property. A total of 18 base-neutral/ acid extractables (BNAs)

were detected exceeding reference criteria in soil and sediment samples collected from the property. Eleven inorganic elements were also present above reference criteria in soil and sediment samples collected from the property. Inorganic concentrations ranged from 1.0 milligrams per kilogram (mg/kg) of selenium in soil sample SS-91-12 (69) to 21,400 mg/kg of iron in sediment sample SD-93-06 (62). In addition, 4,4'-DDE was detected in soil sample SS-91-12 (69) at 9.8 µg/kg.

The nearest private residence and active overburden drinking water well is located 1,800 feet to the south of the H & A Kaufman property. The nearest active private drinking water well screened in bedrock is located 2,056 feet southeast of the property.

Ground water in the vicinity of the H & A Kaufman property is classified as "GB" by the state of Rhode Island. This classification refers to ground water located within a highly urbanized area of industrial activity where ground water may or may not be suitable for direct human consumption due to waste discharges, spills or leaks of chemicals, and land impacts. According to soil boring logs from the H & A Kaufman property, depth to ground water is approximately 2 to 10 feet. Regional ground water flow throughout the North Central Industrial Park appears to extend east-southeast. Localized ground water flow across the H & A Kaufman property is to the east.

In 1982, nine "highly" contaminated private drinking water wells were closed due to elevated levels of organic compounds in ground water. These nine drinking water wells were located within a half-mile of the southern boundary of the North Central Industrial Park. The town of Lincoln is currently supplying drinking water to residents of the nine drinking water wells.

Approximately 5,532 people obtain drinking water from private wells located within four miles of the H & A Kaufman property. Approximately 4,673 people obtain drinking water from public water supply sources located within four miles of the H & A Kaufman property. There are approximately 17,137 people living within a four miles radius of the property.

The H & A Kaufman property is located outside the floodplain of the Moshassuck River.

The Moshassuck River, Providence River/Providence Harbor, and Narragansett Bay are active fisheries. Lime Rock Preserve is located within 15 downstream of the H & A Kaufman property, approximately 0.9 miles east-southeast. Lime Rock Preserve is a unique habitat which supports approximately 10 state endangered or threatened plant species. Approximately 187 acres of palustrine wetland are located within a one-mile radius of the H & A Kaufman property.

10.0 REFERENCES

1. TRCC, 1992. Preliminary Assessment of H & A Kaufman Realty Co. (Lot 62). TDD No. 9108-135-ATP. August 10.
2. TRCC, 1993. Field Logbook for H & A Kaufman Realty Co. (Lot 62) property. TDD No. 9108-135-ATP.
3. Bockstael, 1992. Correspondence from Georges Bockstael (Environmental Consultant for H & A Kaufman Realty Co.) to Sharon Hayes (U.S. Environmental Protection Agency). RE: Evaluation of Preliminary Assessment Potential Source Areas. December 22.
4. USGS, 1949. Pawtucket Quadrangle, Rhode Island - Massachusetts. U.S. Geological Survey, 7.5 Minute Series (Topographic). Photorevised 1970, 1975.
5. TRCC, 1992. Preliminary Assessment of Second Chase Venture (Lot 61). TDD No. 9108-139-ATP. August 20.
6. NUS, 1991. Final Site Discovery - Lot 62. NUS Corporation. July 29.
7. Pare, 1991. Correspondence from Pare Engineering Corporation to Sharon Hayes (U.S. Environmental Protection Agency). RE: Globe Distribution, Inc., (Lot 62). July 9.
8. EPA, 1992. Resource Conservation and Recovery Information Service (RCRIS). U.S. Environmental Protection Agency. October 23.
9. EPA, 1993. Comprehensive, Environmental Response, Compensation and Liability Information System (CERCLIS). U.S. Environmental Protection Agency. October 13.
10. RIDEM, 1982. Emergency Well Testing Program Report. Rhode Island Department of Environmental Management.
11. Michaelson, 1990. Correspondence from Michaelson & Michaelson to Timothy O'Connor (Rhode Island Department of Environmental Management). RE: North Central Industrial Air Park/Globe Industries. October 24.
12. TRCC, 1992. Preliminary Assessment of Crownmark Corporation. TDD No. 9108-134-ATP. August 20.
13. USDHHS, Undated. Toxicological Profile for Polycyclic Aromatic Hydrocarbons, U.S. Department of Health and Human Services, ATSDR/TP-90/20.

14. USDA, 1981. Soil Survey of Rhode Island, U.S. Department of Agriculture, Soil Conservation Service. July.
15. GZA, 1981. Geohydrological Investigations Philip A. Hunt Chemical Plant Lincoln, Rhode Island, prepared for Philip A. Hunt Chemical Corporation, Organic Chemical Division. File Number A-2767.1, October.
16. USGS, 1949. Bedrock Geology of the Pawtucket Quadrangle, Rhode Island - Massachusetts. U.S. Geological Survey.
17. Balogh, A. (TRCC), 1992. Telephone conversations with Ernest Panciera (Water Resources Department, RIDEM). RE: Ground water classification. February 26.
18. RIDEM, 1993. Rhode Island Department of Environmental Management - Wellhead Protection Areas in Rhode Island. July.
19. Easterday, A. (TRCC), 1993. Memorandum to Sharon Hayes (Work Assignment Manager, U.S. EPA). RE: Ground Water Contour Map, North Central Industrial Park, Lincoln/Smithfield, Rhode Island. May 7.
20. Jones, T. (TRCC), 1993. Project Note: Public Water Supply, H & A Kaufman Realty Co. (Lot 62). November.
21. Jones, T. (TRCC), 1993. Project Note: Population and Private Well Users per Target Distance Ring Worksheets, H & A Kaufman Realty Co. (Lot 62). October.
22. USDC, 1991. Census of Population and Housing, Summary Population and Housing Characteristics, U.S. Department of Commerce. July.
23. Balogh, A. (TRCC), 1992. Telephone conversation with Bob Kildoff (Providence Water Supply Board). RE: Water Supply Information, Town of North Smithfield. February 27.
24. Deline, J. (TRCC), 1992. Telephone conversation with Mr. Decelles (North Springfield Water and Sewer Department). RE: Water Supply Information, Town of North Springfield. March 16.
25. Deline, J. (TRCC), 1992. Telephone conversation with Neil Fiorio (Cumberland Water Department). RE: Water Supply Information, Town of Cumberland. March 17.
26. RIDA, 1988. Water Supply Policies for Rhode Island. State Guide Plan Element 721, Division of Planning, Rhode Island Department of Administration. March.

27. Smith, P. (TRCC), 1993. Telephone conversation with Paul Hebert (Owner/Administrator of Hebert Nursing Home). RE: Resident population data and well information. October 22.
28. Smith, P. (TRCC), 1993. Telephone conversation with Mary Anne Abbruzzi (Owner) of Woodland Convalescent Home. RE: Resident population data and well information. October 21.
29. Smith, P. (TRCC), 1993. Telephone conversation with Principal of North Smithfield Elementary School. RE: Well information and school population data. October 21.
30. USGS, 1954. Topographic Map of the Georgiaville, Rhode Island Quadrangle. U.S. Geological Survey, 7.5 Minute Series. Photorevised 1970, 1975.
31. USGS, 1957. Topographic Map of the Providence, Rhode Island Quadrangle. U.S. Geological Survey, 7.5 Minute Series. Photorevised 1970, 1975.
32. USGS, 1955. North Scituate Quadrangle, Rhode Island - Massachusetts. U.S. Geological Survey, 7.5 Minute Series (Topographic). Photorevised 1970, 1975.
33. USGS, 1971. East Providence Quadrangle, Rhode Island - Massachusetts. U.S. Geological Survey, 7.5 Minute Series (Topographic). Photorevised 1979.
34. TRCC, 1992. Preliminary Assessment of International Data Sciences, Inc. TDD No. 9108-136-ATP. August 19.
35. Balogh, A. (TRCC), 1992. Telephone conversation with Town of Lincoln Building Inspector. RE: Flood Zoning. February 27.
36. Jones, T. (TRCC), 1993. Project Note: Surface Pathway Calculations. H & A Kaufman Realty Co. (Lot 62). November 17.
37. Balogh, A. (TRCC), 1992. Telephone conversation with Rick Enser (Natural Heritage Program, RIDEM). RE: Sensitive Environments. February 26.
38. Balogh, A. (TRCC), 1992. Telephone conversation with USGS-Providence Rhode Island. RE: Flow Rate of Moshassuck River. March 6.
39. DOI, 1980. Atlantic Coast Ecological Inventory Map, Providence, Rhode Island, Connecticut, Massachusetts, and New York. U.S. Fish and Wildlife Service. 1:250,000.
40. Jones, T. (TRCC), 1994. Telephone conversation from J. Martella (Division of Site Remediation - RIDEM). RE: Endangered Species in Lime Rock Preserve. July 15.

41. RIDEM, 1993. Lime Rock Preserve Data Sheet. Rhode Island Department of Environmental Management.
42. Jones, T. (TRCC), 1993. Project Note: Wetlands Acreage and Frontage Calculations, H & A Kaufman Realty Co. (Lot 62). November 17.
43. DOI, 1975a. National Wetlands Inventory Map, Providence, Rhode Island Quadrangle. U.S. Department of the Interior.
44. DOI, 1975b. National Wetlands Inventory Map, Pawtucket, Rhode Island Quadrangle. U.S. Department of the Interior.
45. Schmidl, J. (TRCC), 1994. Project Note: Drainage Basin Area Calculation - Lime Rock Preserve (Unnamed Stream). July 13.
46. Commerce, 1992. *Connecticut, Rhode Island Directory of Manufacturers, 1992-1993 Edition*, Published by Commerce Register, Inc., Midland Park, New Jersey.

APPENDIX A

**H & A KAUFMAN REALTY CO. (LOT 62)
GROUND WATER AND SURFACE WATER ANALYTICAL RESULTS
PARE ENGINEERING CORPORATION**

DECEMBER 1989

APPENDIX B
H & A KAUFMAN REALTY CO. (LOT 62)
FLOOR DRAIN SAMPLE ANALYTICAL RESULTS
GEORGES E. BOCKSTAEL (INDUSTRIAL &
ENVIRONMENTAL CONSULTANT)

OCTOBER 8, 1992

APPENDIX C

**H & A KAUFMAN REALTY CO. (LOT 62)
TANK TIGHTNESS TEST RESULTS
WHITCO TESTING, INC.**

NOVEMBER 9, 1992

APPENDIX D

**H & A KAUFMAN REALTY CO. (LOT 62)
SURFACE WATER AND SOIL ANALYTICAL RESULTS
GEORGES E. BOCKSTAEL (INDUSTRIAL &
ENVIRONMENTAL CONSULTANT)**

NOVEMBER 23, 1992

APPENDIX E

**H & A KAUFMAN REALTY CO. (LOT 62)
ANALYTICAL DATA
TRCC**

MAY 24, 1993